Defining Open Burning

Jessica McCarty
Dept. of Geography, Miami University,
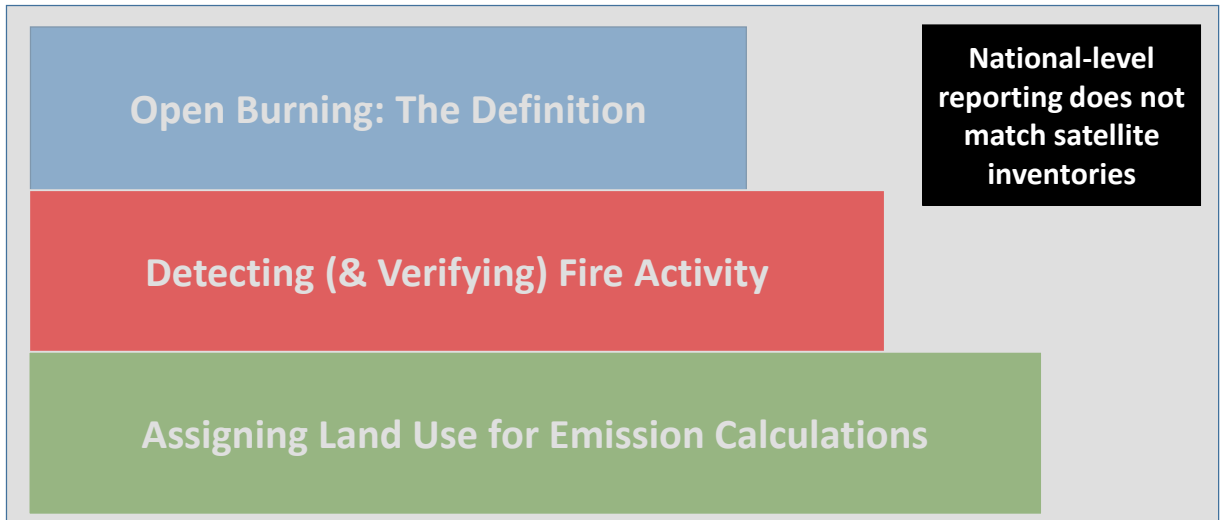Oxford, Ohio, USA
jmccarty@miamioh.edu

1

Open Burning: The Definition

Detecting (& Verifying) Fire Activity

Assigning Land Use for Emission Calculations

2

Open Burning: The Definition

Detecting (& Verifying) Fire Activity

Assigning Land Use for Emission Calculations

National-level reporting does not match satellite inventories

3

Open Burning

Human-caused fire not used in the maintenance of or benefit for wildland systems;

This EXCLUDES prescribed fire for **ecosystem functioning** and lightning-caused fires.
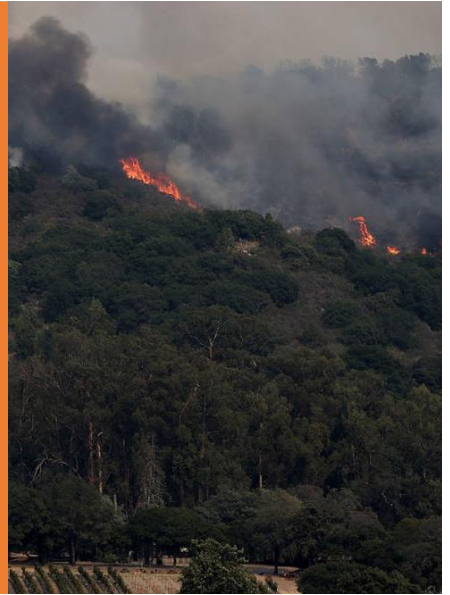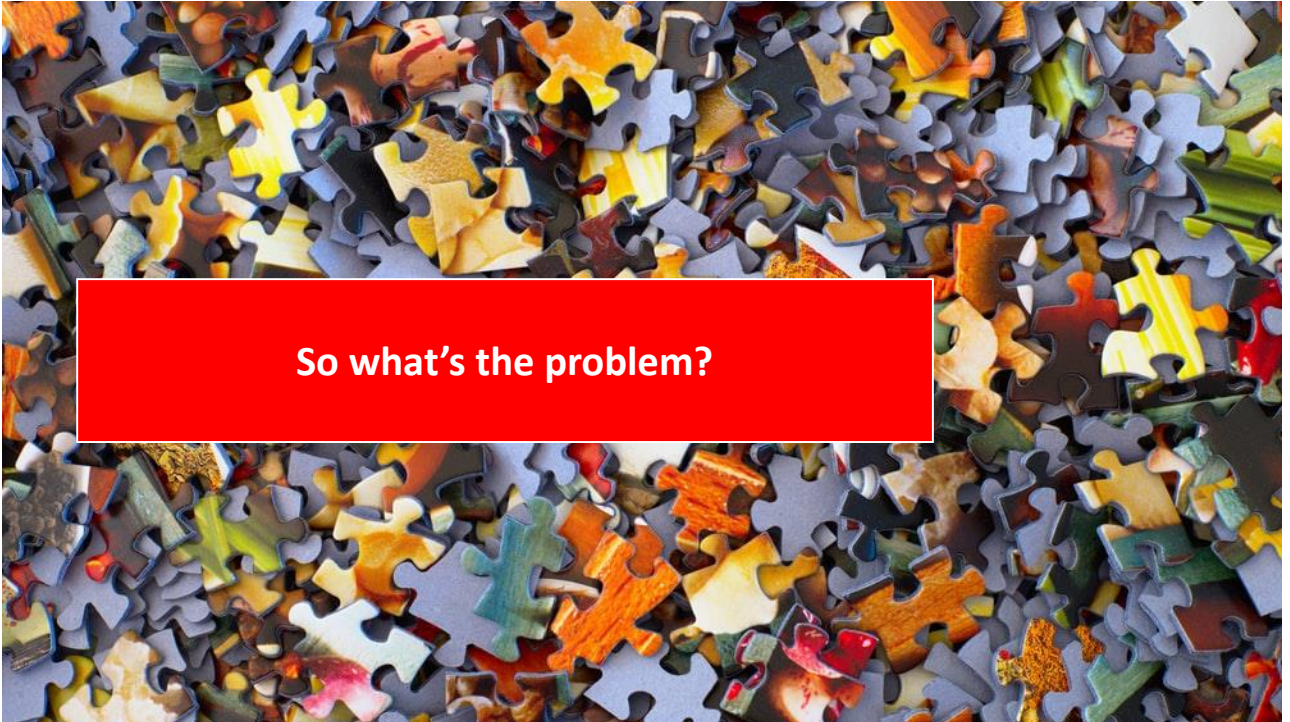
4

Open Burning　　　　**Prescribed Fire**　　　　**Wildfire**

5

What is burning? - Crop type-, pasture-, range-, agroforestry-specific	Satellites will play a role; Geospatial analytics, modeling, in-situ
Who is burning?	
Why and how are they burning?	

6

So what's the problem?

7

Open Burning CAUSED a "Wildfire" – Missed in many inventories

Forest fires in November 2016 caused by spread of fire from open burning in agricultural areas in Peru; source: NASA & Monitoring of the Andean Amazon Project (http://maaproject.org/)

8

Majority of summer 2018 wildfires in Siberia caused by prescribed fires in agroforestry or agricultural fields:
Combination of VIIRS, Sentinel-2, and very high resolution data in ESRI ArcGIS to determine fire starting points and relate to observed burned area.
(https://unearthed.greenpeace.org/2019/05/28/russia-wildfires-siberia-map/).

Zoom-in to fires starting in agricultural fields in Amur Oblast.

ABOUT

UNEARTHED

27.05.2019 by Unearthed staff

Wildfires that ravaged millions of hectares of land and forests in Russia last year may have been caused by so-called "prescribed burning" – a controversial practice intended to prevent the spread of forest fire.

That's according to a new analysis of 2018's Siberian wildfires carried out by GIS specialists at Greenpeace's Global Mapping Hub, who found that the overwhelming majority of those fires started close to places where people travel, work or live, or to sites of deliberate 'prescribed burnings'.

Across the four regions studied the proportion of fires fitting into this category ranged from 65% in Krasnoyarsk Krai to 99% in Amur Oblast.

Use the switches in the "Data" box to explore different layers of the map

9

Thermal Anomaly
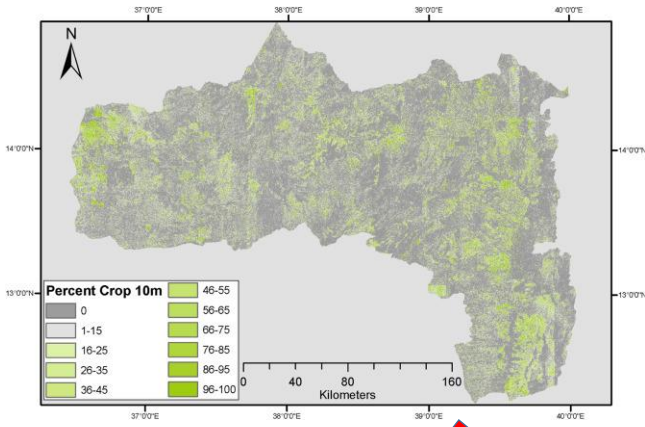Open Burning

Thermal Anomaly
Prescribed Fire

Thermal Anomaly
Wildfire

10

5

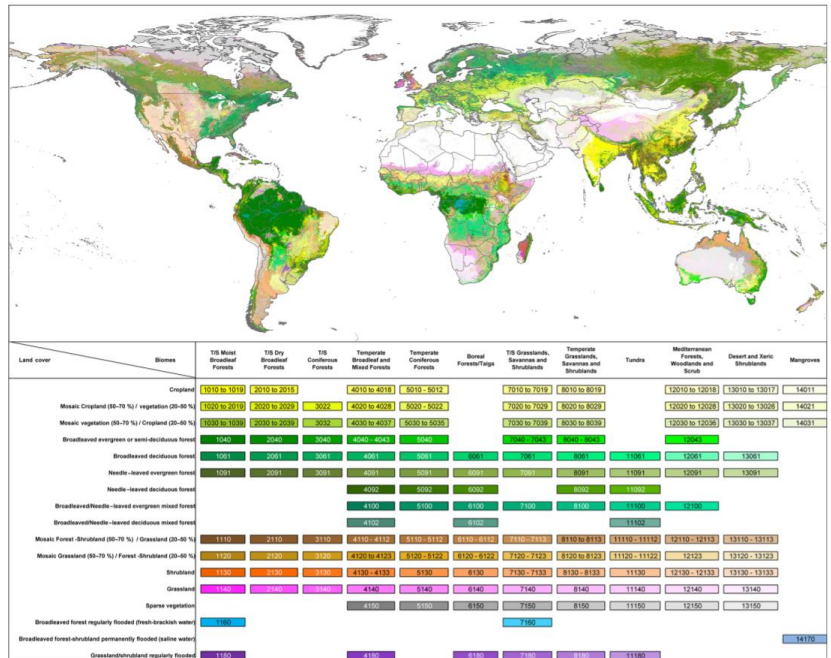## Assigning Land Use: Very High Resolution Agroecosystem Mapping

Sentinel-2
- 10/20 m crop type maps of Europe
- 30 m Landsat 8 global crop cover
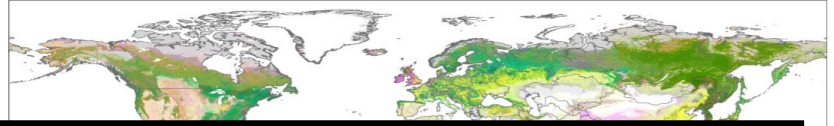- http://pure.iiasa.ac.at/id/eprint/15230/
- https://www.sciencedirect.com/science/article/pii/S0034425718301822

11

Missing (Spatial) Data: Fuel Loads

https://doi.org/10.1594/PANGAEA.849808 & https://www.biogeosciences.net/13/2061/2016/bg-13-2061-2016.html

12

Missing (Spatial) Data: Fuel Loads

Land cover / Biomes	T/S Moist Broadleaf Forests	T/S Dry Broadleaf Forests	T/S Coniferous Forests	Temperate Broadleaf and Mixed Forests	Temperate Coniferous Forests	Boreal Forests/Taiga	T/S Grasslands, Savannas and Shrublands	Temperate Grasslands, Savannas and Shrublands	Tundra	Mediterranean Forests, Woodlands and Scrub	Desert and Xeric Shrublands	Mangroves
Cropland	1010 to 1019	2010 to 2015		4010 to 4018	5010 - 5012		7010 to 7019	8010 to 8019		12010 to 12018	13010 to 13017	14011
Mosaic Cropland (50–70 %) / vegetation (20–50 %)	1020 to 2019	2020 to 2029	3022	4020 to 4028	5020 - 5022		7020 to 7029	8020 to 8029		12020 to 12028	13020 to 13026	14021
Mosaic vegetation (50–70 %) / Cropland (20–50 %)	1030 to 1039	2030 to 2039	3032	4030 to 4037	5030 to 5035		7030 to 7039	8030 to 8039		12030 to 12036	13030 to 13037	14031
Broadleaved evergreen or semi-deciduous forest	1040	2040	3040	4040 - 4043	5040		7040 - 7043	8040 - 8043		12043		
Broadleaved deciduous forest	1061	2061	3061	4061	5061	6061	7061	8061	11061	12061	13061	
Needle-leaved evergreen forest	1091	2091	3091	4091	5091	6091	7091	8091	11091	12091	13091	
Needle-leaved deciduous forest				4092	5092	6092		8092	11092			
Broadleaved/Needle-leaved evergreen mixed forest				4100	5100	6100	7100	8100	11100	12100		
Broadleaved/Needle-leaved deciduous mixed forest				4102		6102			11102			
Mosaic Forest -Shrubland (50–70 %) / Grassland (20–50 %)	1110	2110	3110	4110 - 4112	5110 - 5112	6110 - 6112	7110 - 7113	8110 to 8113	11110 - 11112	12110 - 12113	13110 - 13113	
Mosaic Grassland (50–70 %) / Forest -Shrubland (20–50 %)	1120	2120	3120	4120 to 4123	5120 - 5122	6120 - 6122	7120 - 7123	8120 to 8123	11120 - 11122	12123	13120 - 13123	
Shrubland	1130	2130	3130	4130 - 4133	5130	6130	7130 - 7133	8130 - 8133	11130	12130 - 12133	13130 - 13133	
Grassland	1140	2140	3140	4140	5140	6140	7140	8140	11140	12140	13140	
Sparse vegetation				4150	5150	6150	7150	8150	11150	12150	13150	
Broadleaved forest regularly flooded (fresh-brackish water)	1160						7160					
Broadleaved forest-shrubland permanently flooded (saline water)												14170
Grassland/shrubland regularly flooded	1180			4180		6180	7180	8180	11180			

13