

Canada

Natural Resources Ressources naturelles Canada



2019 Torchlight Update

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Tactical Wildfire Mapping in Canada

- Support began in 2017 for emergency situations only, with 2000 person-hours, 72 days, and 215 maps for BC
- Similar to NIROPS
- Primary focus on creating fire perimeters
- Added segmentation for intense, scattered, and isolated points



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Enhancements from previous years



- Mostly automated, we just have a single person validating the outputs
- Converted to Python script with open source materials as opposed to ArcGIS dependent
- Bigger focus on speed and fire segmentation over perimeter mapping
- Added a contextual filter (similar to that in use for MODIS/VIIRS/AVHRR products)



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YTD Fires					
Agency	2018	2019			
BC	2,028	985			
YT	0	116			
AB	0	981			
NT	0	145			
SK	0	234			
MB	0	277			
ON	0	535			
QC	0	339			
NL	0	93			
NB	0	176			
NS	186	135			
PE	0	2			
PC	0	74			
Total	2,214	4,092			

Area Burned YTD (Ha)							
Agency	2018	2019					
BC	1,331,624	21,032					
YT	0	279,169					
AB	0	883,407					
NT	0	105,167					
SK	0	47,930					
MB	0	101,140					
ON	0	270,030					
QC	0	10,225					
NL	0	320					
NB	0	224					
NS	247	154					
PE	0	9					
PC	0	117,830					
Total	1,331,871	1,836,637					

re averages Area Burned Averages (Ha)												
gency	5 yr	10 yr	15 yr	20 yr	25 yr		Agency	5 yr	10 yr	15 yr	20 yr	25 yr
3C	1,500	1,582	1,667	1,631	1,699		BC	653,092	389,669	288,533	231,014	191,947
т	77	94	103	98	111		YT	106,021	135,157	237,087	191,858	205,743
B	1,099	1,235	1,317	1,243	1,147		AB	234,426	267,478	213,907	204,489	208,674
T	213	205	212	199	226		NT	1,063,194	683,565	548,096	461,182	671,288
к	360	394	401	470	511		SK	581,030	563,807	572,867	502,871	526,294
1B	282	330	346	426	437		MB	56,581	143,410	134,536	140,654	202,656
N	454	679	834	876	1,018		ON	44,200	107,560	80,828	101,550	134,804
QC	297	421	504	576	639		QC	22,176	252,741	255,517	248,082	285,674
1L	78	96	107	126	128		NL	6,176	25,265	21,266	28,630	32,057
IВ	169	197	217	253	273		NB	149	242	263	323	368
IS	199	209	231	249	259		NS	561	547	751	771	699
Έ	4	4	8	9	12		PE	7	21	22	22	34
۲ <mark>C</mark>	84	87	90	88	88		PC	171,156	133,331	121,430	102,707	87,484
otal	4,816	5,533	6,037	6,244	6,548		Total	2,938,769	2,702,793	2,475,103	2,214,153	2,547,722

2019 Canadian fire season





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Chuckegg Creek wildfire (HWF042)

350,000+ ha burned 5,000 evacuated State of emergency Torchlight deployed for 12 days (starting May 20)

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Google Earth

Chuckegg Creek[®] wildfire (HWF042)

Google Earth

Image © 2019 Maxar Technologies

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Chuckegg Creek Deployment



- 21 day deployment, 12 successful mapping days
- First deployment for Alberta
- Alberta is heavy airborne IR user
- No feedback yet hoping to discuss next week
- SOP guidelines from previous year used here

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Enhancements still to come...



- Automatic Human structure detection and classification
- Potential additional classification of "residual heat or cooling" and "hot gas"
- Finalize and implement automated fire perimeter mapping

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Biggest Challenges



- 1. Convince fire managers to use product
- 2. Retrieve cloud-free data
- 3. Commission/Omission errors
- 4. Algorithm efficiency

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Airborne research campaigns





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Canny Edge Detection

- Reduce Noise (Smoothing)
- Find the edge strength (gradient in both dimensions)
- Find and relate edge direction to possible directions
- Apply nonmaximum suppression
- Hysteresis to eliminate streaking









Back edge removal



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Questions?



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