

General Steps Taken
Organize and record raw data
Exploratory analysis (evaluate usefulness, redundancy, whether or not it can be rasterized and resampled, rescaling/reclassifying method, weight value)
Manipulate data (project, reclassify, resample, set extent, clip, rescale (0-1)) Coordinate System: NAD_1983_UTM_Zone_13N Extent: Top (4546669.97105), Left (139999.334905), Right (763249.334905), Bottom (4094119.97105) Resolution: 30m
Summarized by HUC 12
Rescale from 0-1
Weighting (weigh by varying the weights of each layer in a theme)
Composite layers weighting tests (vary weights of forest conditions, living with wildfire, and watershed protection themes and evaluate)

Forest Conditions Theme

Sub-theme	Priority layer	Score/weight	Description	Data Prep Steps	Ranking Criteria	Data Source	URL (if available)
Wildland urban interface	wui(x)_s1	L - 1	Wildland urban interface projected to 2040 – this layer was created by Dave Theobald for the 2014 FAP review. S1 (growth scenario 1---status quo for zoning)	1. merge 2. reclassify - change NA values within CO to 0 (ArcGIS) 3. calculate percent cover = area (WUI)/area(HUC12) (ArcGIS) 4. rasterize 5. rescale	1 = presence; 0 = absence	Dr. Dave Theobald	unpublished
Wildfire Behavior	Fire Type Extreme	M - 2	Potential for canopy fire type under extreme weather conditions	1. project and set extent 2. calculate zonal mean by HUC12 (ArcGIS) 3. rescale	0 (no fire), 1 (surface fire), 2 (Passive canopy fire), 3 (active canopy fire) 0-3 rescaled to 0-1	CO-WRAP	<a href="http://coloradoforestatlas.org">coloradoforestatlas.org</a>
Potential Basal Area Loss - Insect and Disease	pct_tbaloss_CO	M - 2	This layer is a loss of basal area prediction based on insect and disease disturbance through 2027	1. project, clip and set extent 2. Resample (ArcGIS) 3. calculate zonal mean by HUC12 (ArcGIS) 4. rescale	0-100 rescaled to 0-1	USFS-FHAASST (FHTET) NIDRM	<a href="https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/national-risk-maps.shtml">https://www.fs.fed.us/foresthealth/applied-sciences/mapping-reporting/national-risk-maps.shtml</a>

Watershed Protection Theme

Sub-theme	Priority layer	Score/weight	Description	Ranking Criteria	Data Prep Steps	Data Source	URL (if available)
Goal #1. Improve & maintain the quality of water (weighted 2x)	huc12_co_v1_sourcwater_delineation.shp'	H - 4	Municipal Drinking Water Intakes served by area	HUC 12 value (was already at this scale)	1. Rescale, 0-1	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
	sw_nearzone_1' 'sw_nearzone_2' 'sw_nearzone_3' SW_MASTER.gdb	H - 4	Surface water (SW Zone)	Zone area within a sub-watered	1. Merge and dissolve (ArcGIS) 2. project 3. Calculate = area(zone)/area(HUC12) 4. rasterize using area attribute 5. rescale 6. Set extent and mask	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
	max_f23_f28_merged_zonalStat	H - 4	Predicted post-fire erosion rates	raster	1. project and set extent to template layer 2. Merge with taking max value for areas of overlap 3. calculate zonal mean by HUC12 (ArcGIS) 4. rescale	United States Department of Agriculture	<a href="https://www.fs.usda.gov/treesearch/pubs/41632">https://www.fs.usda.gov/treesearch/pubs/41632</a>

Goal #1, continued.  
 Improve &  
 maintain the  
 quality of water  
 (weighted 2x)

'gu_sw_nearzone_1' 'gu_sw_nearzone_2' 'gu_sw_nearzone_3' GU_MASTER.gdb 'gui_sw_zone1_2001' 'gui_sw_zone2_2001' 'gui_sw_zone3_2001' GUI_2001_MASTER.gdb	M - 2	Ground water under the influence of surface water (GUI Zone)	Zone area within a sub-watered	1. Merge and dissolve (ArcGIS) 2. project 3. Calculate = area(zone)/area(HUC12) 4. rasterize using area attribute 5. rescale 6. Set extent and mask	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
'gw'_zone1' 'gw'_zone2' 'gw'_zone3' GW_MASTER.gdb 'gw'_zone1_2001' 'gw'_zone2_2001' 'gw'_zone3_2001' GW_2001_MASTER.gdb	L - 1	Ground Water (GW Zone)	Zone area within a sub-watered	1. Merge and dissolve (ArcGIS) 2. project 3. Calculate = area(zone)/area(HUC12) 4. rasterize using area attribute 5. rescale 6. Set extent and mask	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE

Goal #2. Protect water infrastructure (weighted 1x)

sw_conveyances SWAP_REFERENCE. gdb	H - 4	Conveyances – open channels, ditches, open-channel tunnels	Vector (polyline)-proportional distance in a huc12	<ol style="list-style-type: none"><li>1. rasterize</li><li>2. reclassify and change NA values within CO to 0 (ArcGIS)</li><li>3. zonal sum using zonal statistics (ArcGIS)</li><li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster (ArcGIS)</li><li>5. rescale</li><li>6. Set extent and mask</li></ol>	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
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Goal #2, continued.  
 Protect water  
 infrastructure  
 (weighted 1x)

sw_diversions' SWAP_REFERENCE. gdb	H - 4	Diversions	Point - number of intakes in a huc12	<ol style="list-style-type: none"> <li>1. Point to raster by summing (ArcGIS)</li> <li>2. reclassify and change NA values within CO to 0</li> <li>3. zonal sum using zonal statistics (ArcGIS)</li> <li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster (ArcGIS)</li> <li>5. rescale</li> <li>6. Set extent and mask</li> </ol>	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
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Goal #2, continued.  
 Protect water  
 infrastructure  
 (weighted 1x)

sw_source' SW_MASTER.gdb	H - 4	SW Intakes	Point - number of intakes in a huc12	<ol style="list-style-type: none"> <li>1. Point to raster by summing (ArcGIS)</li> <li>2. reclassify and change NA values within CO to 0</li> <li>3. zonal sum using zonal statistics (ArcGIS)</li> <li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster (ArcGIS)</li> <li>5. rescale</li> <li>6. Set extent and mask</li> </ol>	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
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Goal #2, continued.  
 Protect water  
 infrastructure  
 (weighted 1x)

gu_source' GU_MASTER.gdb 'gui_source_2001' GUI_2001_MASTER .gdb	M - 2	GUI Intakes	Point - number of intakes in a huc12	<ol style="list-style-type: none"> <li>1. Point to raster by summing (ArcGIS)</li> <li>2. reclassify and change NA values within CO to 0</li> <li>3. zonal sum using zonal statistics (ArcGIS)</li> <li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster (ArcGIS)</li> <li>5. rescale</li> <li>6. Set extent and mask</li> </ol>	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
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Goal #2, continued.  
 Protect water  
 infrastructure  
 (weighted 1x)

gw_source' GW_MASTER.gdb 'gw_source_2001' GW_2001_MASTER .gdb	L - 1	Wells	Point - number of wells in a huc12	<ol style="list-style-type: none"> <li>1. Point to raster by summing (ArcGIS)</li> <li>2. reclassify and change NA values within CO to 0</li> <li>3. zonal sum using zonal statistics (ArcGIS)</li> <li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster (ArcGIS)</li> <li>5. rescale</li> <li>6. Set extent and mask</li> </ol>	Colorado Department of Public Health & Environment, Source water assessment and protection (SWAP)	unpublished; shared under non disclosure agreement with CDPHE
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Living with Wildfire Theme

Sub-theme	Priority layer	Score/weight	Description	Ranking Criteria	Data Prep Steps	Data Source	URL (if available)
Wildfire Risk	Wildfire Risk (weighted 1x)	L-1	Wildfire Risk layer is a composite risk map created by combining the Values at Risk Rating and the Burn Probability layers.	values = 0 (no risk) to 5 (highest risk) scaled from 0 to 1	1. project and set extent 2. calculate zonal mean by HUC12 (ArcGIS) 3. rescale	CO-WRAP	<a href="https://www.coloradowildfirerisk.com/map/Pro">https://www.coloradowildfirerisk.com/map/Pro</a>

Forest Wildlife Theme

Sub-theme	Priority layer	Score/weight	Data Prep Steps	Ranking Criteria	Data Source	URL (if available)
Habitat Quality and Connectivity (weighted 2x)	Ecological Connectivity (current flow)	L - 1	<ol style="list-style-type: none"> <li>1. project and set extent</li> <li>2. resample (ArcGIS)</li> <li>3. calculate zonal mean by HUC12 (ArcGIS)</li> <li>4. set extent and mask</li> <li>5. rescale</li> </ol>	values rescaled to 0-1	Brett Dickson, Conservation Science Partners	<a href="https://databasin.org/datasets/7e62c9930e734bbf8ab32d50db97f0c3">https://databasin.org/datasets/7e62c9930e734bbf8ab32d50db97f0c3</a>
	Landscape Disturbance Index 2016	L - 1	<ol style="list-style-type: none"> <li>1. project and set extent</li> <li>2. Invert values (we want to set it as priority)</li> <li>3. calculate zonal mean by HUC12 (ArcGIS)</li> <li>4. set extent and mask</li> <li>5. rescale</li> </ol>	values rescaled to 0-1	Colorado Natural Heritage Program	
Wildlife Distributions and Element Occurrences (weighted 1x)	Mammal Range	L - 1	<ol style="list-style-type: none"> <li>1. Merge different concentrations of the same species before rasterizing</li> <li>2. Rasterize each species separately and merge everything by summing the values (higher value for areas with overlapping species range)</li> <li>3. set absense area as 0 (ArcGIS)</li> <li>4. calculate zonal mean by HUC12 (ArcGIS)</li> <li>5. set extent and mask</li> <li>6. rescale</li> </ol>	Catagorical (presence=1, absence=0)	Colorado Parks and Wildlife	<a href="https://www.arcgis.com/home/item.html?id=ad03ebb46afa47828c65711b489abda3">https://www.arcgis.com/home/item.html?id=ad03ebb46afa47828c65711b489abda3</a>

Wildlife  
Distributions  
and Element  
Occurrences,  
continued  
(weighted 1x)

<p>Critical habitat for species of greater conservation need (Crucial habitat for Tier 1 terrestrial animal and plant SGCN)</p>	<p>L - 1</p>	<ol style="list-style-type: none"> <li>1. project</li> <li>2. rasterize</li> <li>3. reclassify (reverse the numbers) (ArcGIS)</li> <li>4. calculate zonal mean by HUC12 (ArcGIS)</li> <li>5. set extent and mask</li> <li>6. rescale</li> </ol>	<p>It is showing priority level. Therefore, the levels were reversed from 1-5 (0 stays the same since it is classified as no priority) before rescaling values from 0-5 to 0-1.</p>	<p>Colorado Parks and Wildlife</p>	<p><a href="https://www.arcgis.com/home/item.html?id=625345944f5641f29ad6b248d23da73e">https://www.arcgis.com/home/item.html?id=625345944f5641f29ad6b248d23da73e</a></p>
<p>Critical habitat for species of greater conservation need (Priority watersheds for aquatic Tier 1 SGCN)</p>	<p>L - 1</p>	<ol style="list-style-type: none"> <li>1. project</li> <li>2. calculate zonal mean by HUC12 (ArcGIS)</li> <li>3. set extent and mask</li> <li>4. rescale</li> </ol>	<p>0-8 scaled to 0-1, areas with overlapping species ranges would be valued more highly</p>	<p>Colorado Parks and Wildlife</p>	<p><a href="https://www.arcgis.com/home/item.html?id=0779a9df38a342a59be8a3f0c5dec788">https://www.arcgis.com/home/item.html?id=0779a9df38a342a59be8a3f0c5dec788</a></p>

Ancillary Data

Sub-theme	Priority layer	Score/weight	Description	Data Prep Steps	Ranking Criteria	Data Source	URL (if available)
Transmission Lines	trans_lines_liv_atlas	-	-	<ol style="list-style-type: none"> <li>1. rasterize</li> <li>2. reclassify and change NA values within CO to 0 (We are doing this because we are calculating area)</li> <li>3. zonal sum using zonal statistics</li> <li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster</li> <li>5. rescale</li> <li>6. Set extent and mask</li> </ol>	-	-	-
Cell towers	cell_towers_liv_atlas landmobileprivatetransmissiontowers_liv_atlas landmobilebroadcasttowers_liv_atlas landmobileCommerTrans Towers_liv_atlas microwaveservicetowers_liv_atlas pagingtranstowers_liv_atlas	-	-	<ol style="list-style-type: none"> <li>1. merge</li> <li>2. rasterize by summing</li> <li>3. reclassify and change NA values within CO to 0 (We are doing this because we are calculating area)</li> <li>4. raster calculator = area (pixel count) of step 3 raster / area (pixel count) of CO raster</li> <li>5. rescale</li> <li>6. Set extent and mask</li> </ol>	-	-	-