



COLORADO

Colorado Water Conservation Board

Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

May 30, 2019

2019 FLOOD SEASON IS HERE

EXECUTIVE SUMMARY

- Colorado statewide snowpack as of May 30 is at 432% of normal for this date. All basins with the exception of the North Platte, South Platte, and Yampa/White are over 350% of average for this date.
- Widespread, regional snowmelt flooding is not common for Colorado. However, isolated flooding and extended periods of high water are likely to occur this season.
- Numerous watersheds have volumetric forecasts over 130% for the runoff season. It can be implied that these will have the most elevated risk for snowmelt flooding. These watersheds include: Blue, Upper Arkansas, entire Gunnison River basin, Dolores, San Miguel, Mancos, La Plata, Animas, Upper Rio Grande, and Saguache/San Luis
- Extended forecasts have been released. The remainder of May is expected to be cool and wet for the entire state. The forecast for June indicates a wet month for the entire state, with cooler than normal temperatures on the Eastern Plains. The June forecast will be updated on May 31.
- Snowmelt has significantly slowed down during the second half of May. This may result in a heightened risk of snowmelt flooding in June.
- Areas downstream of recent burn scars are at heightened susceptibility to flash floods, and mud and debris flows.

Link to Colorado Climate Center Presentation to the Water Availability Task Force (May 14, 2019):
<https://dnrweblink.state.co.us/cwcbsearch/ElectronicFile.aspx?docid=209275&dbid=0>

Link to NRCS Snow Survey Presentation to the Water Availability Task Force (May 14, 2019):
<https://dnrweblink.state.co.us/cwcbsearch/ElectronicFile.aspx?docid=209274&dbid=0>

Link to Climate Prediction Center June Forecast:
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/

Link to daily Colorado Flood Threat Bulletin issued by Colorado Water Conservation Board:
<http://www.coloradofloodthreat.com/>

Link to River Forecasts:
<https://water.weather.gov/ahps/>



DISCUSSION:

The State of Colorado experiences 100-year floods (1% annual chance floods) each and every year. Spring flood season will soon revisit the citizens of Colorado, prompting the Colorado Water Conservation Board to issue a reminder that individuals and business owners should consider, be aware of, prepare for, and insure against flood threats. The May 30, 2019 SNOTEL data provided by the Natural Resources Conservation Service, which estimates snowpack for the major watersheds of Colorado, indicates that basinwide snowpack for all major river basins is at 432% of normal for this date. It is still at 82% of normal peak amounts, but nearly seven weeks later than the normal peak date of April 7th. Although runoff is already occurring, only 38% of the measured snowpack has melted.

However, individual smaller watersheds within these larger river basins are still reporting readings as high as 700% of average, indicating that localized snowmelt flooding is still a distinct possibility. For example, the Gunnison watershed is currently 568% of normal for this date, and the SW basins (consisting of Dolores, Animas, and San Juan basins) is currently 713% of normal. All major river basins except the North Platte, South Platte, and Yampa basins are above 350% of normal snowpack for this time of year.

Some additional basin-by-basin facts:

- The Arkansas River basin currently sits at 423% of normal. Only 34% of the snow has melted off, and the watershed still sits at 91% of its normal peak over six weeks after the normal peak date of April 11.
- The Colorado River basin currently sits at 376% of normal. Only 35% of the snow has melted off, and the watershed still sits at 85% of its normal peak over six weeks after the normal peak date of April 10.
- As noted above, the Gunnison River basin currently sits at 568% of normal. Only 38% of the snow has melted off, and the watershed still sits at 91% of its normal peak nearly seven weeks after the normal peak date of April 6.
- The North Platte River basin currently sits at 213% of normal. Only 26% of the snow has melted off, and the watershed still sits at 87% of its normal peak over six weeks after the normal peak date of April 11.
- The Rio Grande basin currently sits at 459% of normal. Only 38% of the snow has melted off, and the watershed still sits at 78% of its normal peak over six weeks after the normal peak date of April 10.
- As noted above, the SW River basin currently sits at 713% of normal. Only 35% of the snow has melted off, and the watershed still sits at 99% of its normal peak over seven weeks after the normal peak date of April 6.
- The South Platte River basin currently sits at 324% of normal. Only 14% of the snow has melted off, and the watershed still sits at 97% of its normal peak nearly five weeks after the normal peak date of April 26.
- The Yampa/White River basin currently sits at 236% of normal. Only 41% of the snow has melted off, and the watershed still sits at 68% of its normal peak over six weeks after the normal peak date of April 11.

It is important to keep these numbers in perspective. What happens as runoff season progresses is that the average snowpack drops very quickly as snow runs off in an average year. This lowers the denominator in the equation to increasingly smaller numbers, which can result in extremely high percents of average. The thing to keep in mind for this year is that snowpack is holding on late, not that enormous actual snowpack numbers are being observed. However, this does significantly increase the risk of snowmelt flooding as a much higher amount of snow is still available to melt as the state heads into the much warmer month of June.

In addition, unforeseen climactic conditions, such as a very wet spring (as was experienced in 1995, for example), or a sudden sustained warming trend occur (as was experienced on the Western Slope in 1984, for example), can create damaging flooding even when snowpack is below average.

It is also important to note that Colorado's worst flood events have historically occurred from general spring rainfall and summer thunderstorms, which are completely unrelated to snowmelt flooding resulting from mountain snowpack. For this reason, even residents in areas with lower snowpack should exercise caution in evaluating flood risk. These rain-induced flood events are of concern every year to floodplain managers as they are difficult to predict and often create flooding conditions with very little warning. Based on these historical experiences, widespread, regional snowmelt flooding is possible, but unlikely, this year. Localized and isolated flooding has already occurred and is likely to continue occurring throughout runoff season. An extended season of high water is a near certainty this year.

Current medium- and long-range forecasts point to cooler-than-average and wetter-than-average conditions for the remainder of May. This will lower the risk for snowmelt flooding due to heat waves in May. It could raise the risk for rain-on-snow flooding during May. Regardless, a cooler and wetter May could increase the risk for snowmelt flooding when June arrives, as a lower amount of snowpack will be melted relative to average climate conditions during May, indicating more will be left to melt during the warmer month of June. The forecast for the month of June was released on May 16, 2019. It will be updated on May 31. The May 16 forecast indicates the likelihood of cooler than normal temperatures on the eastern plains with no trend west of the Continental Divide for warmer or cooler than average temperatures. However, the forecast calls for a wetter than normal month throughout the entire state.

NRCS streamflow forecasts for the season were released on May 1st (see link in the executive summary above). These streamflow forecasts are volumetric forecasts, meaning they indicate the total amount of runoff and not necessarily the peak flowrates. However, it may be implied that a forecast for a higher than normal volumetric forecast may result in a greater risk of a higher than normal peak flowrate since there is more snow to melt. The seasonal volumetric forecasts are greater than average for the majority of the state (in fact, only the St. Vrain watershed is forecasted to be below 89% of average). However, the following watersheds are forecasted to have runoff values substantially greater than average: Blue, Upper Arkansas, entire Gunnison River basin, Dolores, San Miguel, Mancos, La Plata, Animas, Upper Rio Grande, and Saguache/San Luis. Each of these watersheds is forecasted to have seasonal runoff volumes greater than 130%, and are at the highest risk of snowmelt flooding.

This year's flood season also poses an increased risk to those properties located within and downstream of areas impacted by major wildfires that have occurred within the past several years, (e.g. 416 Fire in La Plata County, Spring Fire in Huerfano/Costilla Counties, Lake Christine Fire in Eagle County, and Hayden Pass Fire in Fremont County). While the runoff characteristics of fire ravaged watersheds will improve with each passing year, experience has shown that minimal recovery will occur naturally in the first 2-3 years, and substantial recovery may not be seen for seven or more years, especially from high intensity burns, which Colorado has experienced with increasing frequency.

Finally, this year featured an unprecedented number of avalanches that created numerous debris fields. These debris fields should be accounted for in monitoring and response plans, especially if there is a threat for them to become mobile during a flood event.

To prepare for this year's runoff and rain season, local officials are encouraged to consider the following steps: identify, prepare, monitor, notify, and evaluate mitigation for future seasons.

IDENTIFY

Take steps to identify the areas of your community that are most at risk. Numerous sources can be available for this identification. First and foremost, check Flood Insurance Rate Maps (FIRMs) prepared by FEMA as part of the communities Flood Insurance Study (FIS). Be aware that these maps generally assess those areas within the community that are subject to a 1% chance of flooding in any given year. Be aware that due to unexpected circumstances or events greater than a 1% chance occurring, areas adjacent to these identified floodplains may also be at a heightened risk as well.

Other studies may be available at the community level. Long time residents and local officials will likely have institutional knowledge of areas within the community that are often threatened by rising rivers.

PREPARE

Understand that in most cases, a flood cannot be stopped once it has started. Under certain conditions, certain flows may be able to be rerouted into safer areas of the community, but preparations should focus on managing the flood in place if it occurs.

One of the most important actions to take prior to the flood occurring is to clean out constricted areas of rivers and waterways of debris that has deposited over the winter if it is anticipated to negatively affect infrastructure. Pay special attention to constricting structures, such as roads, culverts, irrigation

diversion structures, and levees. These areas are most likely to develop debris dams that will clog and have the potential to back up water.

If structures are known to be threatened, it may be worthwhile to consider stockpiling sandbags. This could be done in one of two ways. Filled sandbags can be stored and applied onsite when it is determined they are needed. Alternatively, unfilled bags can be available along with a stockpile of sand, and the bags can be filled up, possibly by the property owner, when needed. Be sure to follow proper procedures for filling sandbags, as improperly filled and stacked sandbags may not provide the desired protection. A good reference can be found here:

https://www.nola.com/homegarden/2017/08/how_to_properly_fill_and_stack.html

Check levee structures for weaknesses. Pay attention to animal burrows, which should be filled immediately, and any other evidence of water seeping through the structure. Review operational procedures if any closures, such as at road crossings, need to be activated.

Follow established flood action plans. These plans may identify what actions to take when water reaches certain levels. These actions may include road closures, resident notification, and evacuation notices. Know which officials are responsible for which actions, and establish relationships and lines of communication prior to the flood. Keep phone numbers and other contact information handy so that they can be quickly retrieved if needed.

You may want to consider non-structural actions aimed at increasing public safety. For example, if your waterway is a popular location for recreation, you might consider temporarily closing it or placing restrictions on allowed activities. This could provide safety from not only high water but the increased potential for debris that many waterways may face this year.

Be sure to notify residents that driving through flood waters should be avoided at all time. “Turn around don’t drown” is an established outreach program aimed at preventing drivers from entering even shallow water in roadways. Floodwaters are often dark and murky and it is difficult to determine how deep the water is. By far, the most deaths in floods occur from drivers entering flooded roadways and losing control of their vehicles. It only takes a few inches of water before cars will begin to float.

Be prepared for sediment and debris. This is especially important in areas downstream of wildfire burn scars as well as areas downstream of avalanches. Debris can be problematic for a number of reasons. It can raise flood water surfaces due to a bulking factor. It can clog constrictions such as bridges and culverts, and can also prevent water from entering storm sewers. It can also cause safety concerns to both people and property due to blunt force impact.

Outreach should be provided regarding the availability and sale of flood insurance. This is the best mechanism to prevent losses due to flooding. It must be emphasized that a 30-day waiting period exists for flooding. Therefore, if this option is to be implemented, the time is now. A Q&A section

regarding flood insurance is presented at the end of this document. Be aware that mud and debris flows may not be covered under available insurance – check with your insurance carrier in the case of homeowner’s insurance or with FEMA in regards to Flood Insurance through the National Flood Insurance Program.

MONITOR

Be aware that snowmelt floods are caused by two things: 1) Snowpack that is available to melt, and 2) A trigger event, usually a 5+ consecutive day warmup or widespread rainfall that falls on snowfields that can quickly accelerate melt.

The rate of runoff is more controlled by the day-to-day weather than the snowpack percentage. The two types of trigger events referenced above can often be forecast with some degree of accuracy up to a week out. More than a week out, forecasts become less certain.

Based on Colorado’s historical climate experience, the 5+ day warmup is a more common trigger to accelerate snowmelt. A good rule of thumb is that if a warm period of five or more consecutive days with overnight low temperatures exceeding freezing temperatures (32+ degrees) at 11,000-12,000 feet is experienced, local officials should be prepared for significant flooding. Snowmelt is a momentum process in which each day builds on the runoff from the previous day. Therefore, one cold day in the middle of a long stretch of warm days will restart the process.

A rain-on-snow event is more rare, but can be potentially more destructive. It can result in a significant increase in runoff rate immediately following the rain event. These trigger events are more difficult to predict, but if high elevation rain is being forecasted for a snow-covered area, local officials should be prepared for significant flooding.

It is suggested that local officials monitor 7-day forecasts frequently throughout runoff season. There are numerous sources for weather forecasts. The most common can be found here:

National Weather Service www.weather.gov

The Weather Channel www.weather.com

CWCB Daily Flood Threat Bulletin www.coloradofloodthreat.com

Medium and long-range forecasts can be useful to look ahead, but users are reminded that they offer less precision and accuracy than short-range forecasts. The best place to monitor medium and long-range forecasts is at the Climate Prediction Center:

<https://www.cpc.ncep.noaa.gov/>

River forecasts are issued at key stream locations. These forecasts can be found here:

<https://water.weather.gov/ahps/>

Colorado is covered by four River Forecast Centers:

- Colorado Basin River Forecast Center: all basins west of the Continental Divide
- Missouri Basin River Forecast Center: North Platte and South Platte basins
- Arkansas – Red Basin River Forecast Center: Arkansas basin
- West Gulf River Forecast Center: Rio Grande basin

The link to access all the river basin forecast centers is here:

<https://water.weather.gov/ahps/rfc/rfc.php>

Monitor the National Weather Service and the CWCB Flood Threat Bulletin for watches and warnings. Understand that a Flood Watch indicates that conditions are favorable for a flood to occur, but that flooding is not assured or imminent. A Flood Warning means that flooding is imminent or already occurring. A Flood Advisory is issued when minor flooding may occur but will be below the thresholds expected to necessitate a Flood Warning.

If a community is downstream of significant debris that can accumulate and back up water, officials are encouraged to closely monitor the situation and be prepared to implement safety operations if needed.

NOTIFY

In the event of an unfavorable forecast, local officials should communicate imminent risk to their citizens and stakeholders. Err on the side of caution – while everybody is familiar with “the boy who cried wolf”, public safety should always take precedence in periods of uncertainty. By all means, it is acceptable to explain and highlight the uncertainty during communications with the public. The public should be reminded that while emergency services are doing what they can to mitigate risk to public safety, the ultimate responsibility for life and property protection resides with the public and property owners.

In the event that a flood is imminent or already occurring, it is time to quickly act to implement the processes and actions identified in “Prepare” above. Be aware that some flood events, especially flash floods or areas downstream of wildfire burn scars, may have warning times of only a few minutes. Also be aware that certain evacuation routes may be cut off during flood events.

EVALUATE MITIGATION FOR FUTURE SEASONS

What happens this year during the flood season (or what nearly, but not quite, happens) will provide valuable clues for areas at risk. After the flood season ends, it is worth considering mitigation options to limit risk due to flooding in future years.

Mitigation activities fall within six general groups:

- Prevention: planning and zoning, open space preservation, floodplain management, stormwater management, fluvial hazard zone mapping and management
- Property Protection: acquisition, relocation, building elevation, floodproofing, sewer backup protection, insurance
- Natural Resource Protection: wetland protection, erosion and sediment control, stormwater best management practices
- Structural Projects: reservoirs, levees and floodwalls, channel modifications, enlarging culverts and bridge openings, diversions, storm sewers
- Public information: map information, outreach projects, real estate disclosure, library documents, technical assistance to citizens, environmental education
- Emergency services: flood warning, flood response, critical facilities protection, health and safety maintenance

There is no better indicator of a community's flood problems than going through an actual flood or a near miss. Take note of your community's response to flooding, both in terms of physical flooding characteristics as well as process and procedures, and take steps to improve these for the future.

LIST OF IMPORTANT CONTACTS AND RESOURCES

Colorado Division of Homeland Security and Emergency Management:

<https://www.colorado.gov/dhsem>

720-852-6600

Colorado Water Conservation Board

cwc.state.co.us

303-866-3441

Colorado Division of Water Resources

www.water.state.co.us

303-866-3581

Colorado Department of Local Affairs

www.colorado.gov/dola

303-864-7720

Colorado Department of Transportation

www.codot.gov

See website for phone numbers

FEMA Region VIII

<https://www.fema.gov/region-viii-co-mt-nd-sd-ut-wy>

303-235-4800

Floodsmart – National Flood Insurance Program Insurance Website

<https://www.floodsmart.gov/>

1-800-427-4661

National Weather Service Forecast Offices

Boulder <https://www.weather.gov/bou/> 303-494-4221

Pueblo <https://www.weather.gov/pub> 719-948-9429

Grand Junction <https://www.weather.gov/gjt/> 970-243-7007

Goodland <https://www.weather.gov/gld/> 785-899-7119

Q&A on Frequently asked Flood Insurance Questions

Property owners in high risk areas should be aware that for locations near watercourses, even minor rainstorms could bring streams out of their banks and cause flood-related damages. Property owners' most reliable protection against flood losses is flood insurance coverage. Most homeowner and casualty policies do not cover the peril of flood. Flooding may also occur during very high rain events outside of the identified 100-year or regulatory floodplain. Based on historical information extending over 100 years, Colorado averages \$55 million (in 2007 dollars) annually in flood damages. You can purchase flood insurance at any time. However, there is a 30-day waiting period after you've applied and paid the premium before the policy is effective with very few exceptions. Because of this enforced waiting period, it is impossible to purchase flood insurance when the threat is imminent. **Therefore, now is the time to look into flood insurance so that the 30-day waiting period will be over and coverage will be in force during the peak flood season.**

It is also important to be aware that mapped floodplains only represent areas subject to damage from the 100-year flood. Floods can and do exceed this extent, and therefore property owners outside of the mapped floodplains should consider protecting themselves also. Events in recent years provided perfect examples of how even properties located outside of mapped 100-year floodplains can be damaged or destroyed. This can be especially prevalent in areas downstream of recent wildfire burn scars, where floods can be significantly exacerbated for several years. Flood insurance is a good investment because it is the best means for protecting your largest investment (your home) from flood loss. **Call your insurance agent today. For more information, or to find out if your community participates in the NFIP, contact the National Flood Insurance Program at 1-800-427-4661 for the names of local agents who handle flood insurance policies or contact your local insurance agent. You may also contact the Colorado Water Conservation Board at 303-866-3441 for additional assistance.**

Frequently asked questions about flood insurance

Can I buy flood insurance in high risk areas? You can buy flood insurance no matter where you live in your community as long as your community belongs to the National Flood Insurance (NFIP). There are currently 253 cities, counties, and towns statewide that participate in the NFIP.

Can I buy flood insurance if I live outside of the 100-year floodplain? You can buy flood insurance no matter where you live in your community as long as your community belongs to the National Flood Insurance (NFIP). There are currently 253 cities, counties, and towns statewide that participate in the NFIP. Flood insurance is still available outside of mapped floodplains, and may be available for lower rates.

Does the 100-year flood event happen only once every 100 years? The 100-year flood event is a frequently misunderstood term. It indicates an event that has a 1% chance of being equaled or exceeded in any given year. A 100-year flood could happen multiple times in one year, or it might not occur in 1,000 years. The term "100-year flood" simply refers to the expected probability of the event occurring based on the best available information. The probability of a 100-year flood occurring at the outer edge of a floodplain in a 30-year period (the average length of a residential mortgage) is 26%. Homes located further within the regulatory floodplain may have an even higher likelihood.

Is federal disaster assistance available to damaged buildings without flood insurance? Every year around the country, many homeowners are dismayed to find out that federal disaster assistance falls well short of providing enough relief to cover costs from damages. Federal disaster assistance is only

available in the event of a federally-declared disaster and, other than short-term living expenses, generally takes the form of low-interest loans, which must be paid back. While the damages to the Gulf Coast in 2005 made headlines regarding the availability of federal disaster assistance, property owners have experienced past flooding losses that could not be repaid. It should also be noted that property damages have been recorded every year in Colorado, even in years when federal disasters are not declared. Flood insurance is the best way to protect your property from floods.

Doesn't my homeowners insurance cover flooding? Unfortunately, many homeowners do not find out until it is too late that their homeowner's policies don't cover flooding. Federal flood insurance protects your most valuable assets -- your home and belongings.

Is flood insurance only available to homeowners? Flood insurance is available to protect homes, condominiums, apartments and non-residential buildings, including commercial structures. Talk to your insurance agent for limits of coverage for each.

If my property has been flooded previously, can I still buy flood insurance? It doesn't matter how many times your home, apartment or business has flooded. You are still eligible to purchase flood insurance through the National Flood Insurance Program, provided that your community is participating in the NFIP.

Is there any type of coverage for my basement under the NFIP? Basement coverage extends to cleanup expenses and items used to service the building, such as elevators, furnaces, hot water heaters, washers and dryers, air conditioners, freezers, utility connections, circuit breaker boxes, pumps, and tanks used in solar energy systems. **The policy does not cover the contents of a finished basement and improvements, such as finished walls, floors and ceilings.**