CLOSED BASIN & LAKE FLOODING

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Flood -noun;

A condition of partial or complete inundation, of normally dry land areas, from the overflow of inland waters, or from the unusual and rapid accumulation or runoff of surface waters from any source.

In North Dakota, flooding is most often associated with areas along streams or rivers caused by record rainfall, snowmelt runoff, and ice jams. However, in recent years, areas of the state have also encountered "closed basin" flooding, caused by a continual, wetter than average, weather cycle.

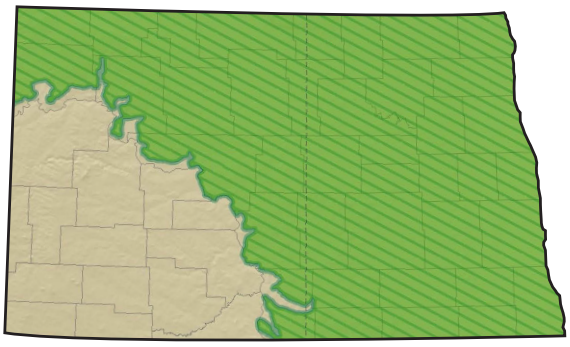
Closed basin lakes have infrequently used outlets that do not allow the discharge of surplus water, causing them to flood. But unlike river and stream flooding that typically peaks and then recedes; closed basin and lake flooding is much longer-term.

CLOSED BASIN

A closed basin is a watershed that does not typically drain, unless under extreme hydrologic conditions. In these areas, surface water can only exit the watershed naturally through the processes of evaporation, transpiration (evaporation through plant leaves), through infrequent high level outlets, or seepage into the ground. Precipitation collects in the lowest topographical depressions of these basins and forms lakes, ponds, and sloughs.

A typical characteristic of closed-basin flooding is a very slow rise in water levels. Generally, people who experience this type of flooding are not first exposed to overland flooding. Instead, their basements begin to fill due to high ground water levels associated with the slow rise of the closed basin flooding.

There are thousands of closed basin lakes, ponds, and sloughs throughout North Dakota. However, the majority of them are located north and east of the Missouri River in an area known as the Prairie Pothole Region. Closed basin flooding can happen on both small and large scales. Prairie potholes are a good example of small scale closed basin flooding. While Devils Lake is an example of large scale closed basin flooding.

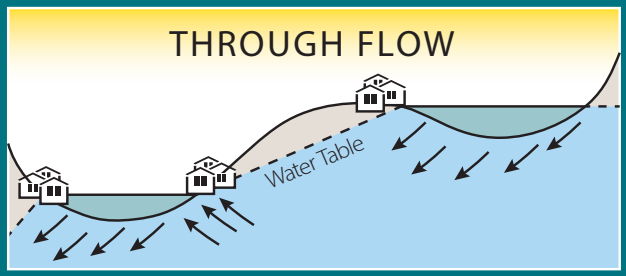


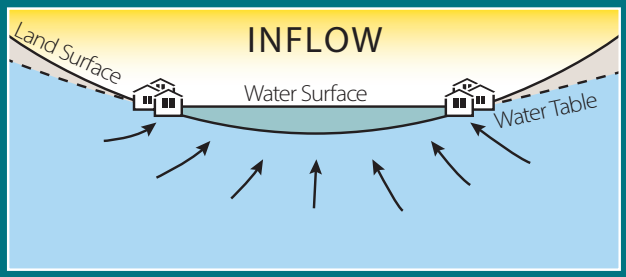
Prairie Pothole Region of North Dakota

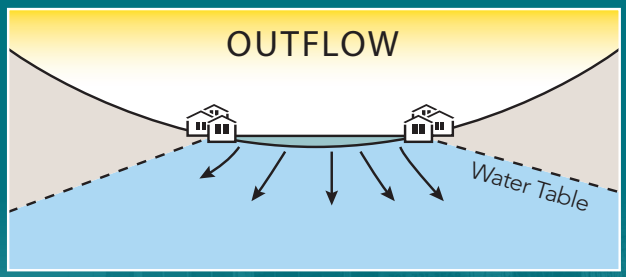
WHAT'S HAPPENING BELOW THE GROUND?

What we see on the surface is only half the story. In closed basin systems, ground water typically causes problems for homeowners before surface water does. These diagrams show the relationship between ground water and surface water.

Ground/Surface - Water Exchange



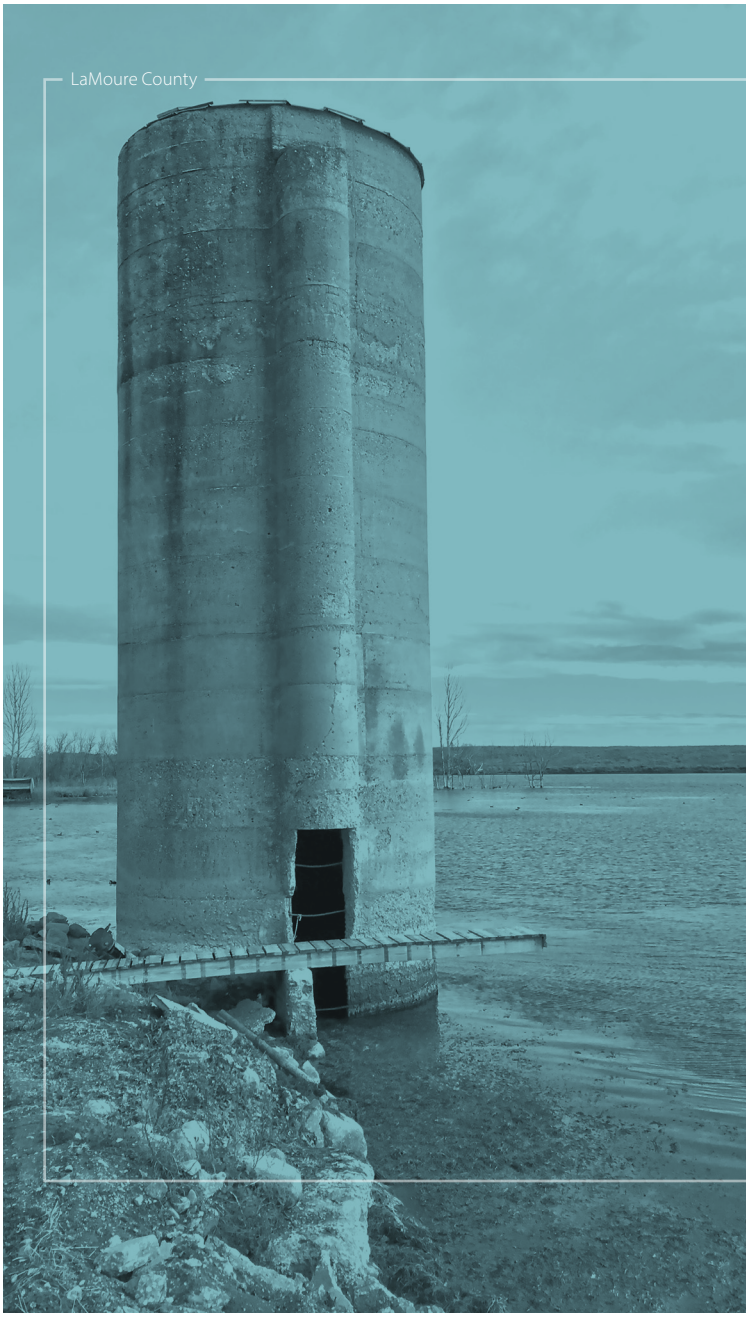




KNOW YOUR RISKS

Everyone is at risk of flooding. If you live near rivers and streams, your risk is naturally higher. However, even people who reside in areas that have flood protection such as floodwalls, levees/dikes, and diversions are at risk if these flood protection measures are overtopped or fail. Additionally, people who are in the middle to upper portions of drainage basins are also at risk of overland flooding in the event that streets and storm sewers are inundated by extreme rainfall events. If you answer yes to any of these questions, you might be at a higher risk of closed-basin flooding.

- Do I live within the Prairie Pothole Region?
- Do I live near a lake, pond, wetland, or slough?
- Is it unclear where a lake, pond, or slough's outlet is?
- Over the past decade, have the levels of these water bodies been rising?
- Are there other residences or buildings in the area that have experienced recent flooding?
- Are there water drainage issues around my property?



CHALLENGE

Beginning in the early 1990s, the State of North Dakota began experiencing a wet cycle. As a result, the runoff from snowfall and rain events have filled many of the state's prairie potholes. Since many water bodies are situated in closed basins, water levels continue to rise. In some cases, excess water has overtopped the banks and connected with other potholes, forming larger lakes and sloughs.

It is not uncommon to find the water level of these closed basins so high that floods or the threat of flooding becomes a challenge. Potential damage to nearby towns, rural houses, agricultural structures, and recreational properties has heightened. Further, in some locations, ground water levels have elevated and caused basements to flood.

In many riverine areas, the Federal Emergency Management Agency (FEMA) has mapped, analyzed, and assessed the risk of flooding. Residents in those areas may use that information to help understand the risks involved with owning property and living in certain mapped areas. Depending on the level of risk, flood insurance may be required to obtain a federally backed home loan.

However, FEMA has not determined the probability of flooding everywhere. They select areas to study based on current flood risk, available data, increases in development, population affected, and other related factors. Unfortunately, many of North Dakota's closed basin areas have not been chosen for a FEMA mapping project. Therefore, flood risk is unknown. As a result, flood insurance is not federally required and many people are left without financial protection from floods. Fortunately, if the local community participates in the National Flood Insurance Program, flood insurance is available.

EDUCATE YOURSELF

The following outlines steps that can be taken to mitigate flood risks if you live near or are thinking about building near closed basin water bodies.

The State Water Commission's Map Service, available on its website (www.swc.nd.gov), has many tools that can be used to help understand water and water-related issues around your property. These tools can be found within the "Information and Education" tab, titled "Maps/GIS and Data".

AERIAL PHOTOGRAPHY

One of the best things you can do to mitigate risk is to research information available on areas where you are planning to build or currently live. Historical records, such as past aerial photographs may give you a visualization of where water has been in the past, compared to where it is now.

TOPOGRAPHIC MAPS

The MapService also has United States Geological Survey Topographic Maps available for all areas in North Dakota. By studying these maps one can interpret area elevations, low areas, areas with poor drainage, as well as wetlands, lakes, and stream courses.

- If you are building a house with a basement near bodies of water or if your area has naturally high ground water levels, evaluate whether a basement might have ground water problems.
- Seek advice from professional engineers, surveyors, and reputable home builders to assist in new building placement.
- Consult with County Water Resource Districts on potential flooding problems to collaboratively find solutions with other area landowners who may also be at risk.
- Speak with your local zoning and permitting entities regarding building regulations and required permits.
- Locate new buildings in locations away from potential flooding areas.
- Consider purchasing flood insurance for your property. *However, be aware that flood insurance covers losses due to overland flooding only - not ground water.*

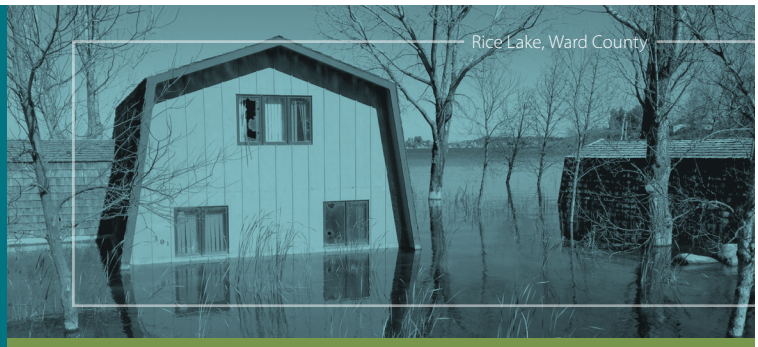
The problem with researching past water levels, is that our climate and water level records are relatively short. These records, at most, show a relatively small slice of history and do not give us a full picture of water level possibilities.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

Through your research and analysis of flood mitigation/ prevention opportunities, you may find that you are interested in the National Flood Insurance Program (NFIP). According to the FEMA:

"NFIP aims to reduce the impact of flooding on private and public structures. It does so by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socioeconomic impact of disasters by promoting the purchase and retention of general risk insurance, but also of flood insurance."

As was discussed in an earlier section of this pamphlet, not all areas are officially "mapped" by FEMA. However, if you live in a community that participates in the NFIP, you can purchase federally backed flood insurance. More than 20% of flood claims made to the NFIP are from moderate to low-risk areas, which includes un-mapped areas.



More information regarding NFIP: www.femasmart.gov

If you are interested in purchasing flood insurance from the NFIP, there are a couple details to keep in mind. First, NFIP flood policies cover damages due to overland flooding. Flooded basements caused by ground water are not covered. Second, there's typically a 30-day waiting period from the date of purchase before a flood policy goes into effect. If you wait until a flood is imminent, chances are you've waited too long.