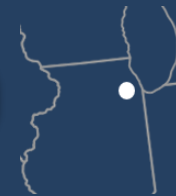


River Ice Spotter Network Training Information

Last Updated: November 20, 2024

W. Scott Lincoln, GISP
Senior Service Hydrologist



Chicago, Illinois



River Ice Spotter Network Training Information

Summary

- Why do we need river ice spotters?
- Ice jam flooding examples
- Where & when do we see river ice and ice jams?
- River ice types, typical ice formation, typical ice melt/break-up
- Ice jams
- River ice spotter network procedures

River Ice Spotter Network Training Information

Why do we need river ice spotters?



River Ice Spotter Network Training Information

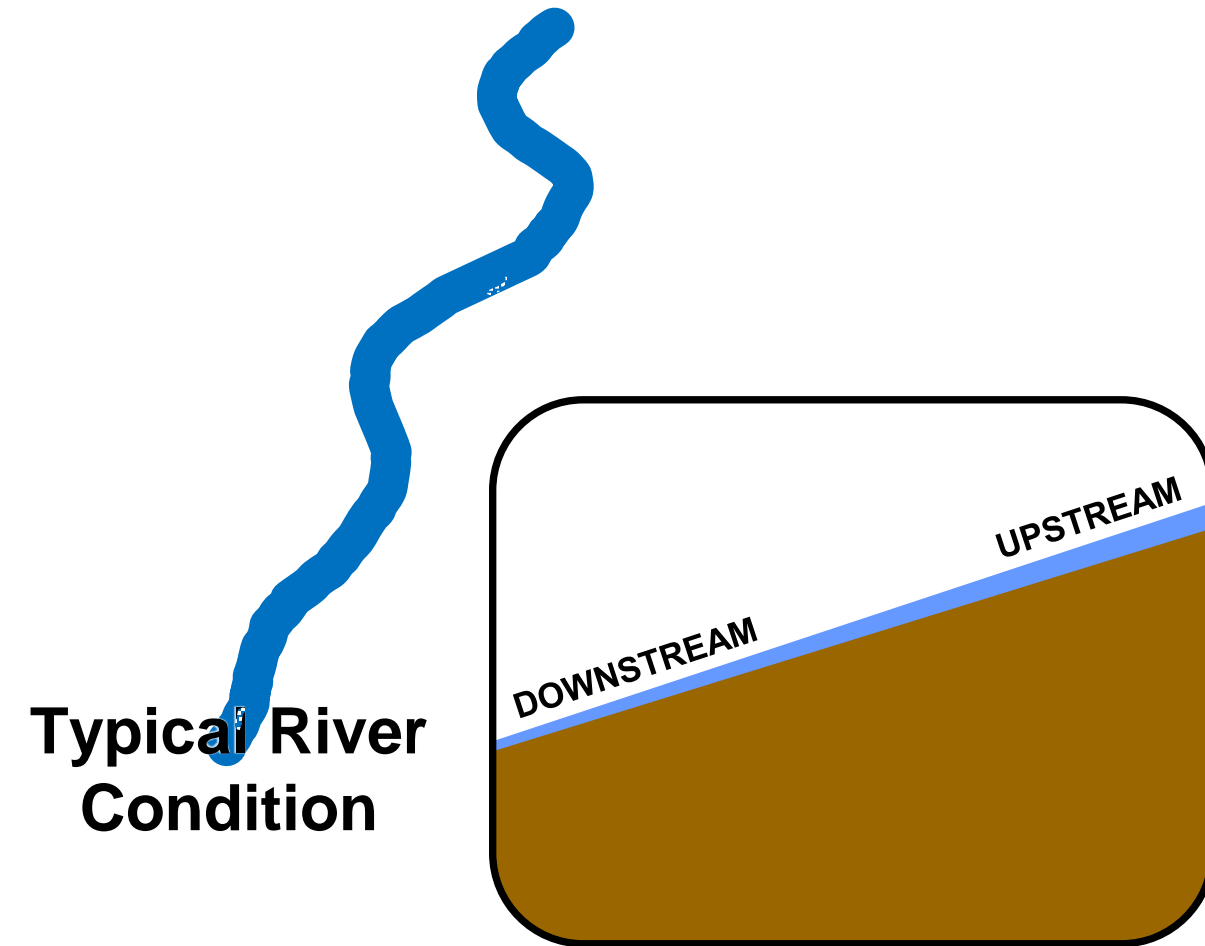
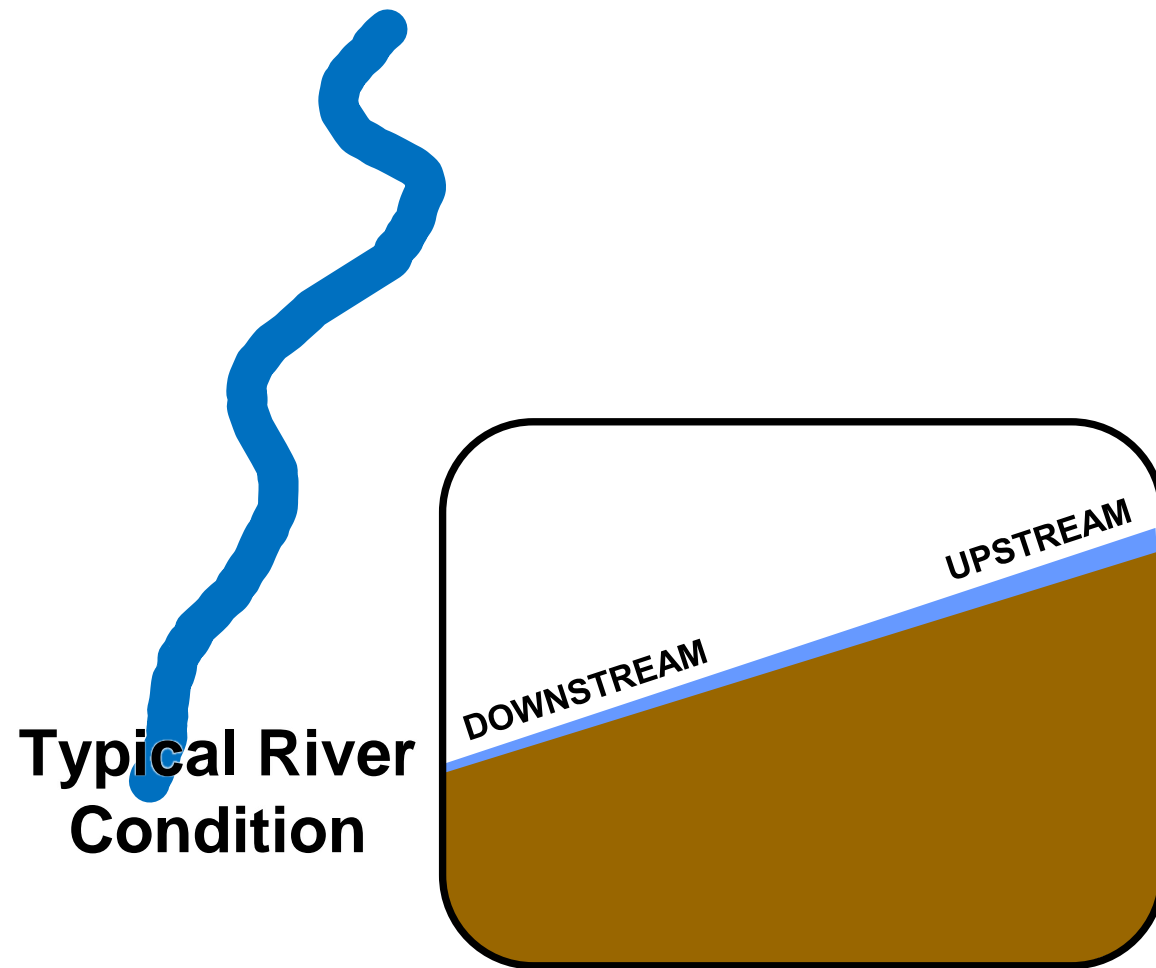
Why do we need river ice spotters?

	Typical River Flooding	Ice Jam Related Flooding
Cause	Typically rainfall or snowmelt	River ice, also possibly rainfall and snowmelt
Extent/Coverage	Typically large sections of rivers and streams	Typically localized areas



River Ice Spotter Network Training Information

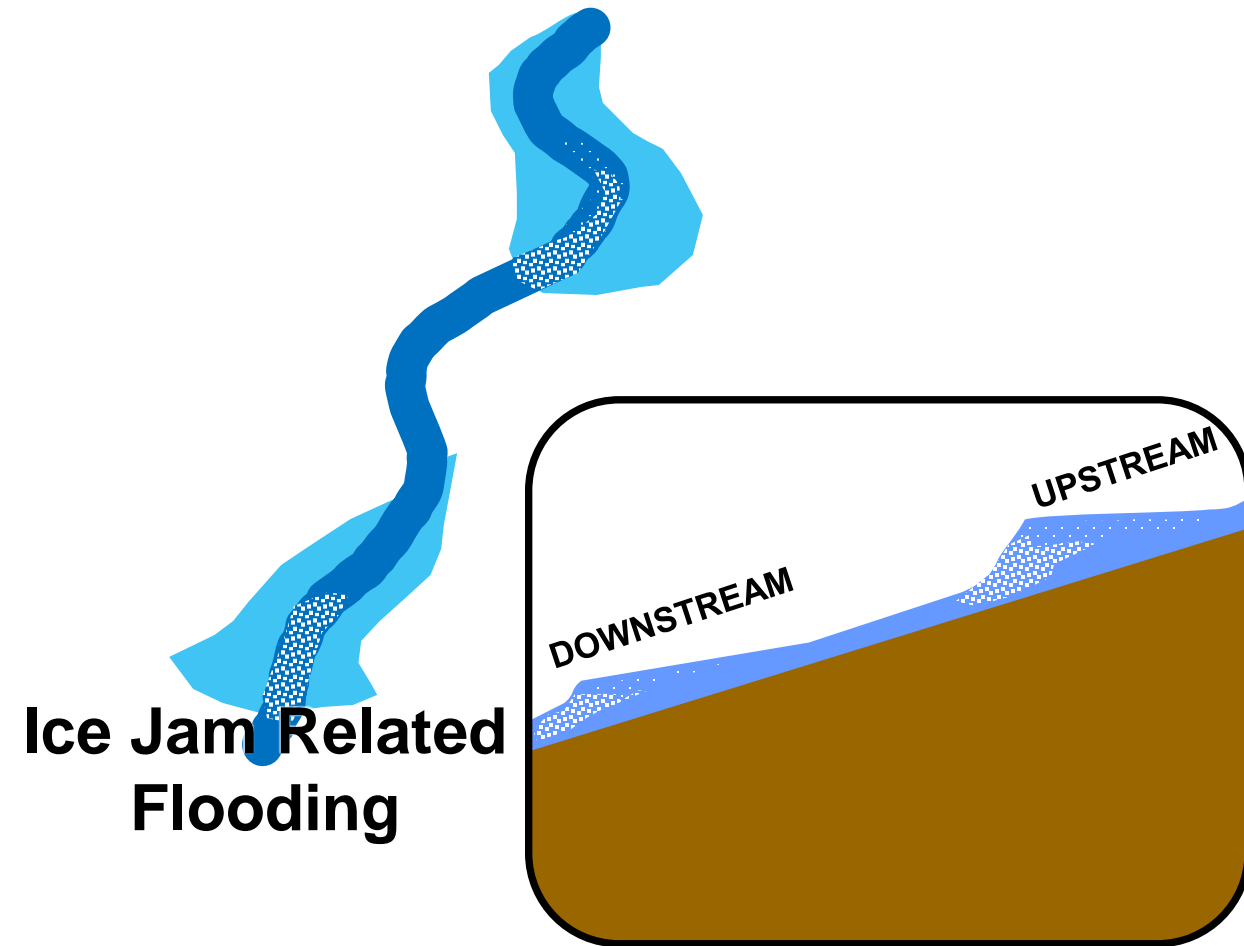
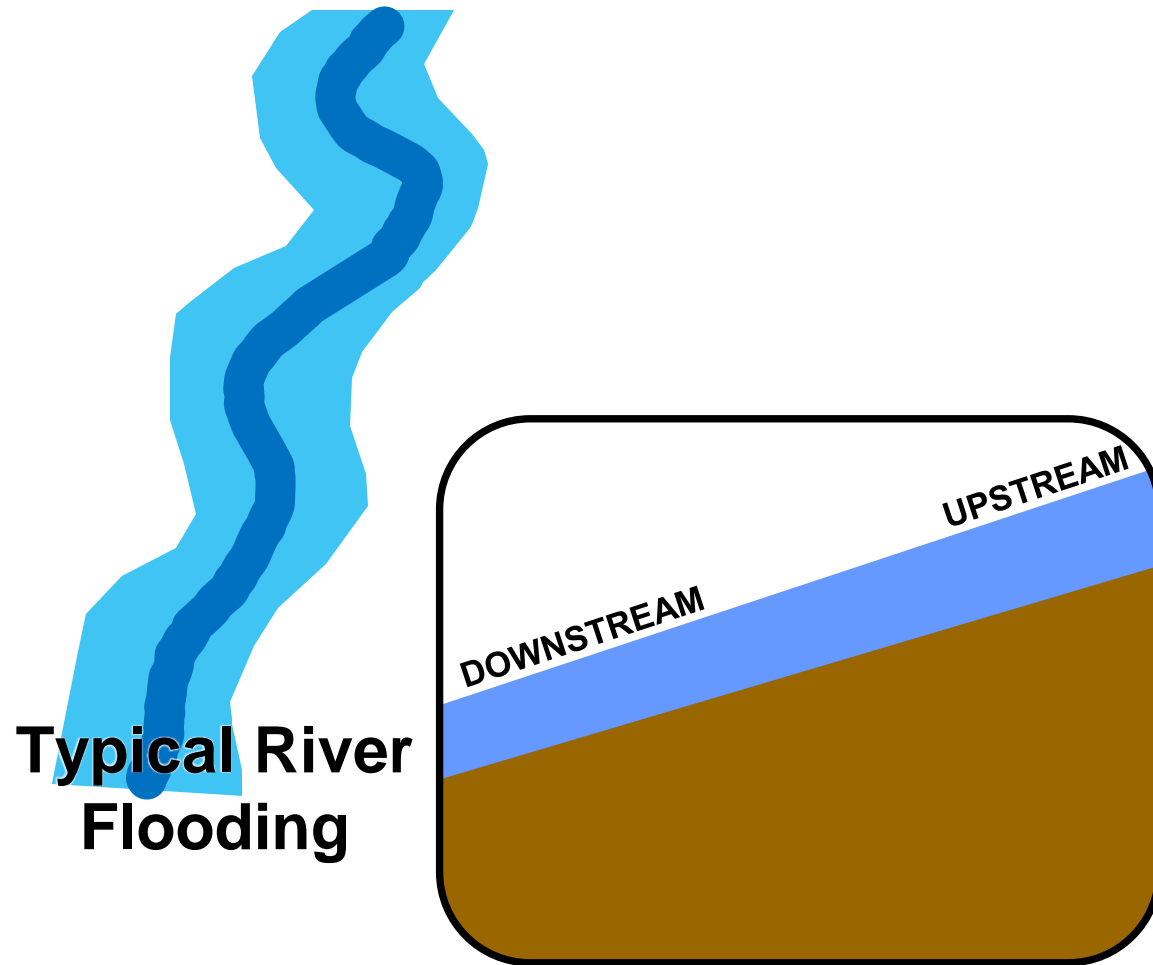
Why do we need river ice spotters?





River Ice Spotter Network Training Information

Why do we need river ice spotters?

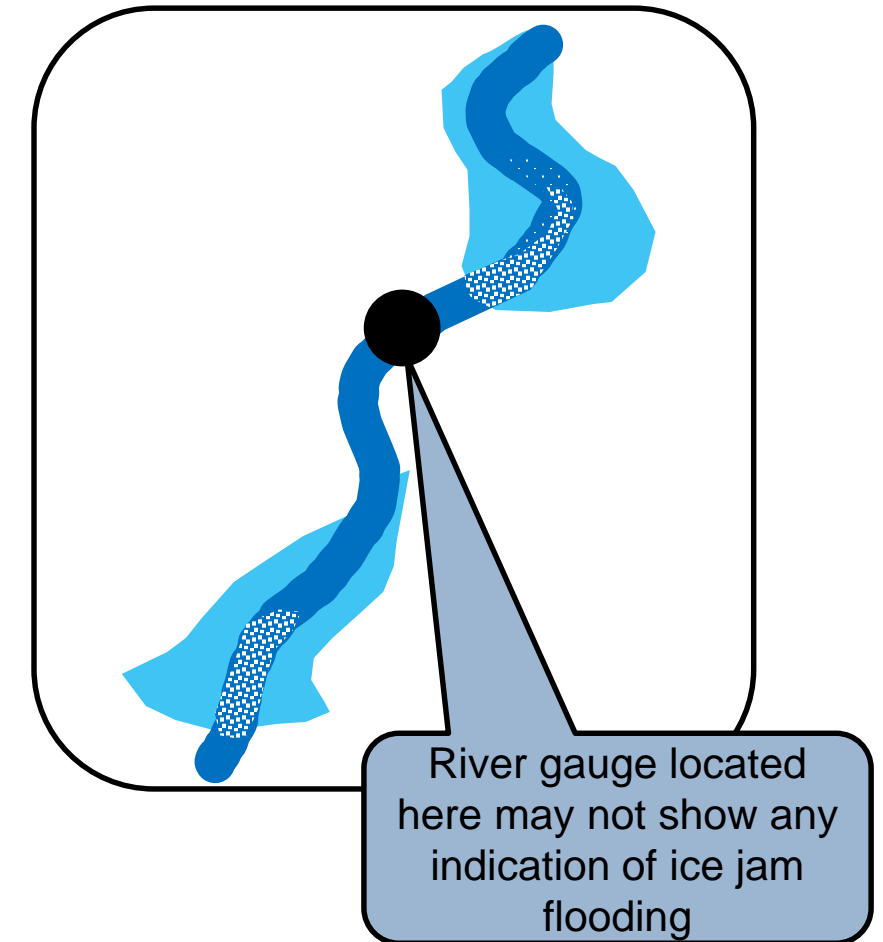




River Ice Spotter Network Training Information

Why do we need river ice spotters?

- River gages provide only limited indication of ice
- Ice jams occurring away from river gauges may not be detected at all
- Ice jam flooding can happen in minutes and early notification allows for timely warnings





River Ice Spotter Network Training Information

Why do we need river ice spotters?

Information needed to assess flood risk from ice jams:

- River ice cover
- River ice type
- River ice trend (increasing/decreasing coverage)
- Whether or not flood is occurring

River Ice Spotter Network Training Information

Ice Jam Examples



River Ice Spotter Network Training Information

River ice and ice jam examples



Image Credit: Unknown

Rock River at Dixon
Winter 2009-2010





River Ice Spotter Network Training Information

River ice and ice jam examples

Fox River at Dayton Dam – Typical



Image Credits: Unknown

Winter 2009-2010





River Ice Spotter Network Training Information

River ice and ice jam examples

CHICAGO'S VERY OWN **WGN9** NEWS MORNING NEWS MIDDAY NEWS SPORTS CONTESTS TRAFFIC BACKSTORY SHOWS EVENTS WEATHER 44 CHICAGO'S VERY OWN **WGN9** MORNING NEWS

7-mile ice jam on Kankakee River threatens flooding

POSTED 12:16 PM, FEBRUARY 1, 2019, BY DANA REBIK, UPDATED AT 08:25AM, FEBRUARY 2, 2019

FACEBOOK TWITTER LINKEDIN PINTEREST EMAIL

This is an archived article and the information in the article may be outdated. Please look at the time stamp on the story to see when it was last updated.



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XELJANZ may cause serious side effects, including:

Serious infections. XELJANZ can lower the ability of your immune system to fight infections. Some people can have serious infections while taking XELJANZ, including tuberculosis (TB), and infections caused by bacteria, fungi, or viruses that can spread.

FULL DISCLOSURE INFORMATION INCLUDING BOXED WARNING AND MEDICATION GUIDE



Image Credits:
WGN, WLS



Kankakee River near Wilmington Winter 2018-2019

Significant ice jam



River Ice Spotter Network Training Information

River ice and ice jam examples



Image Credit: Roger LeJune

Vermilion River in Pontiac
Winter 2021-2022
Ice flow during break-up



River Ice Spotter Network Training Information

River ice and ice jam examples



Fox River at Yorkville
Winter 2021-2022
Heavy sheet ice

Image Credit: Kendall County EMA



River Ice Spotter Network Training Information

River ice and ice jam examples



Rock River near Machesney Park
Winter 2022-2023



Image Credit: Ken Kotlarz



River Ice Spotter Network Training Information

River ice and ice jam examples



Image Credit: Joliet Weather Center

Kankakee River near Wilmington
Winter 2023-2024
Significant ice jam



Image Credit: Civil Air Patrol



River Ice Spotter Network Training Information

River ice and ice jam examples

Kankakee River near Wilmington Winter 2023-2024

Damage due to break up of significant ice jam



Image Credits: NWS Survey

River Ice Spotter Network Training Information

Where & when do we see river ice and ice jams?



River Ice Spotter Network Training Information

Where do we see river ice jams?

Ice jams typical in areas of the country with...

- January average temperatures around 0°C (32°F) or colder
- Annual average of 100+ accumulated freezing degree days

Freezing Degree Days

A measure of how cold it has been, and for how long.

The amount of degrees below freezing for a daily average temperature, summed over a particular number of days.

Example: A day with an average temperature of 30F adds 2 freezing degree days to the running total.



River Ice Spotter Network Training Information

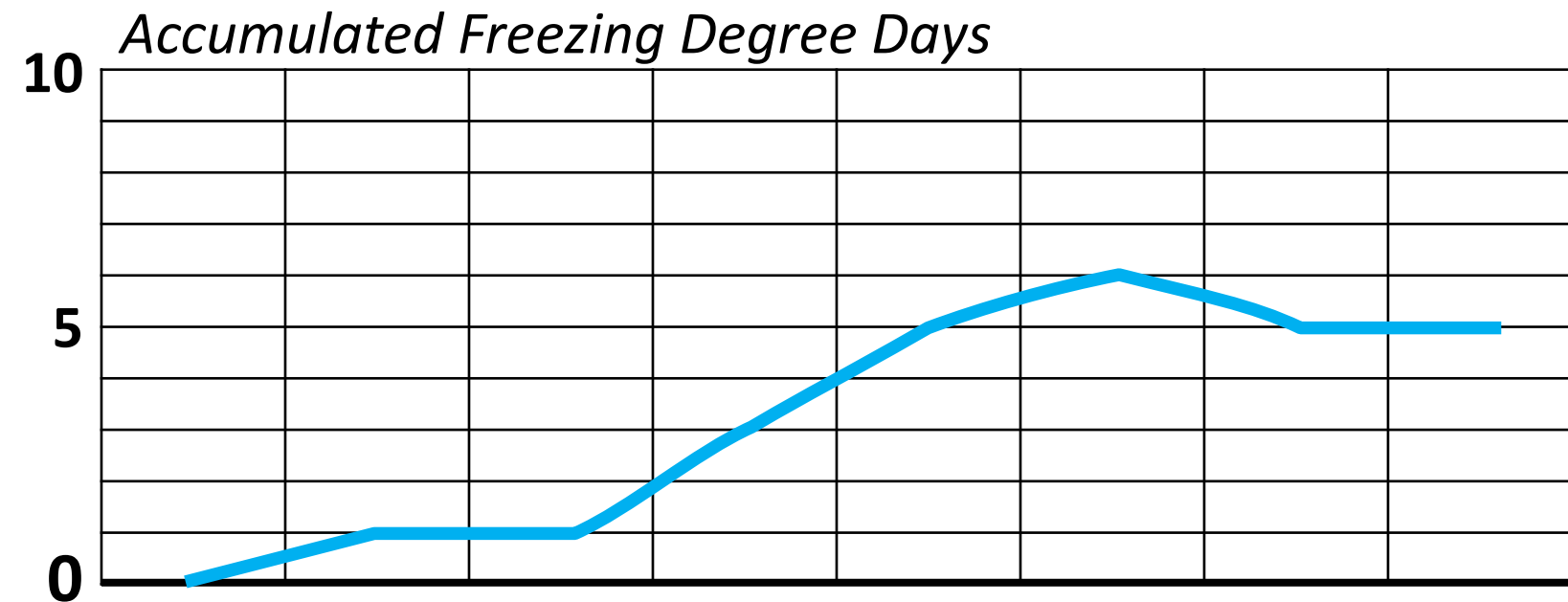
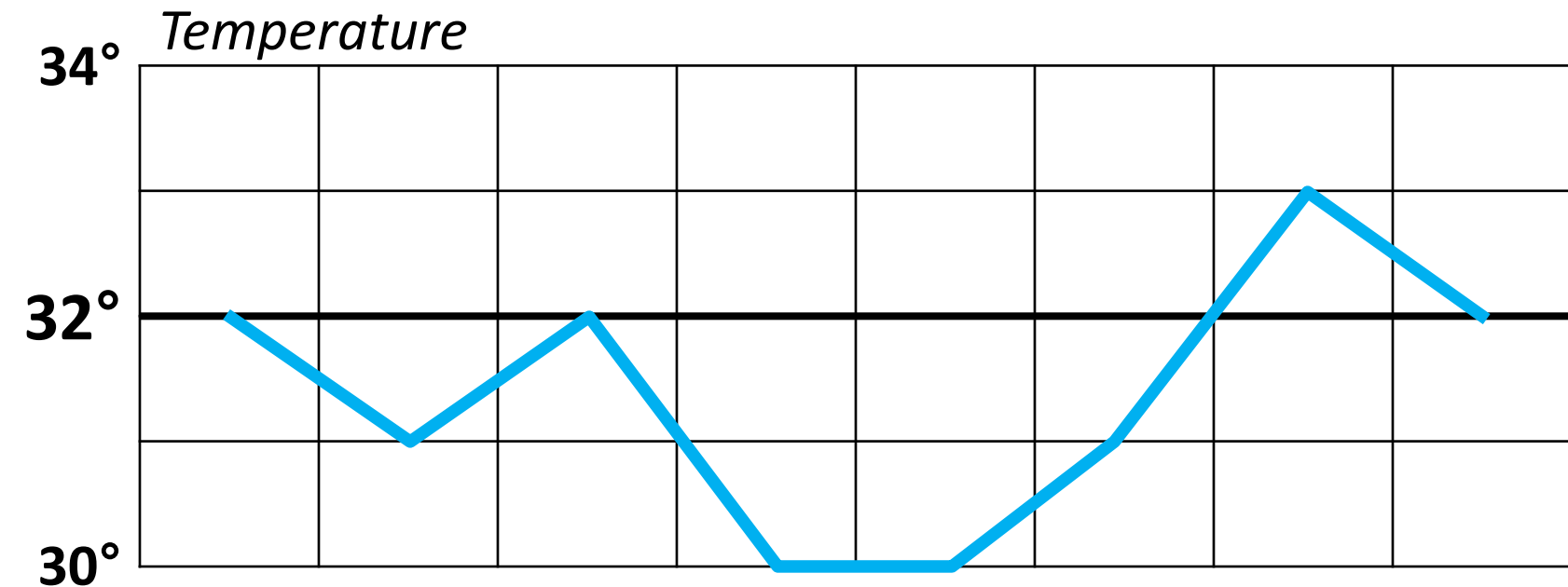
Where do we see river ice jams?

Freezing Degree Days

A measure of how cold it has been, and for how long.

The amount of degrees below freezing for a daily average temperature, summed over a particular number of days.

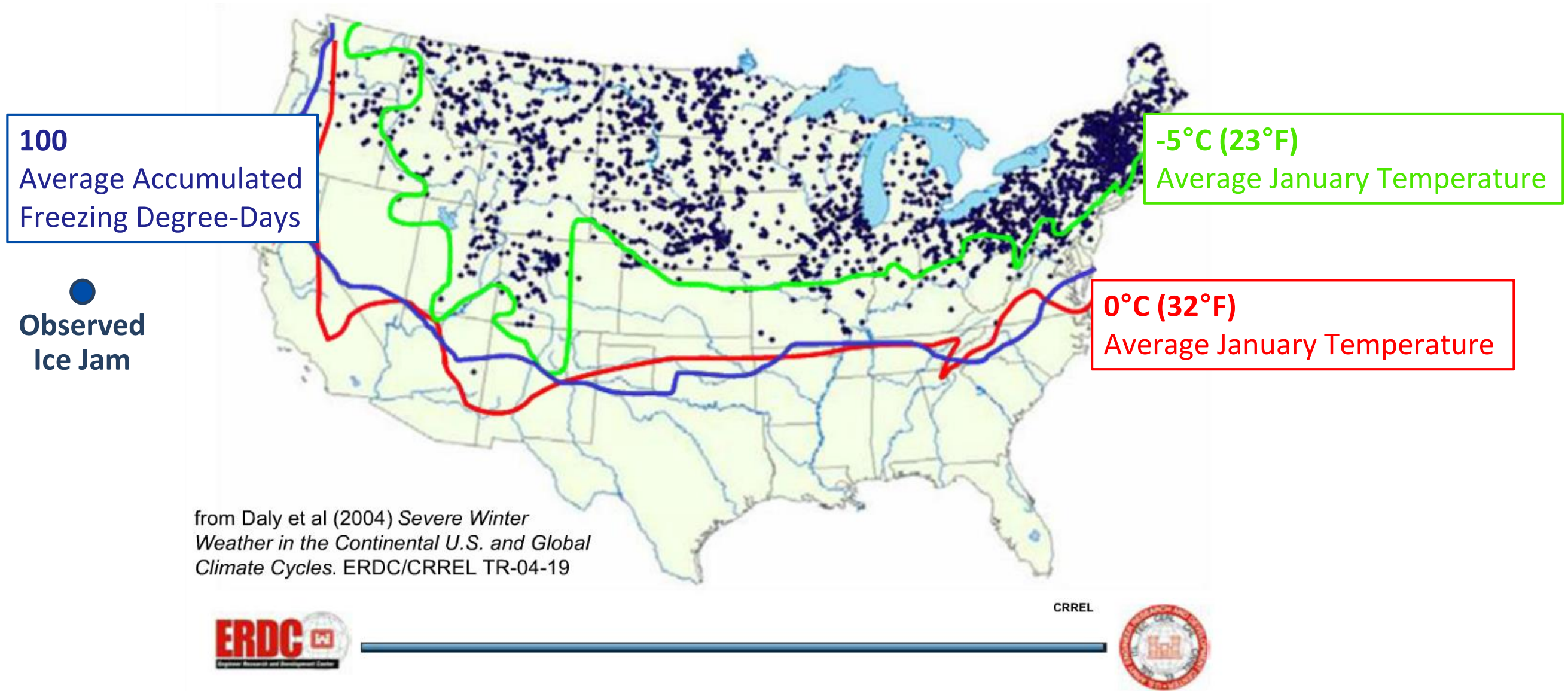
Example: A day with an average temperature of 30F adds 2 freezing degree days to the running total.





River Ice Spotter Network Training Information

Where do we see river ice jams?





River Ice Spotter Network Training Information

Where do we see river ice jams?

Common ice trouble spots:

- Stream constrictions, such as bridges
- Sharp meanders, or bends, in a stream
- Obstructions, such as islands
- Change in stream slope



River Ice Spotter Network Training Information

When do we see river ice and ice jams?

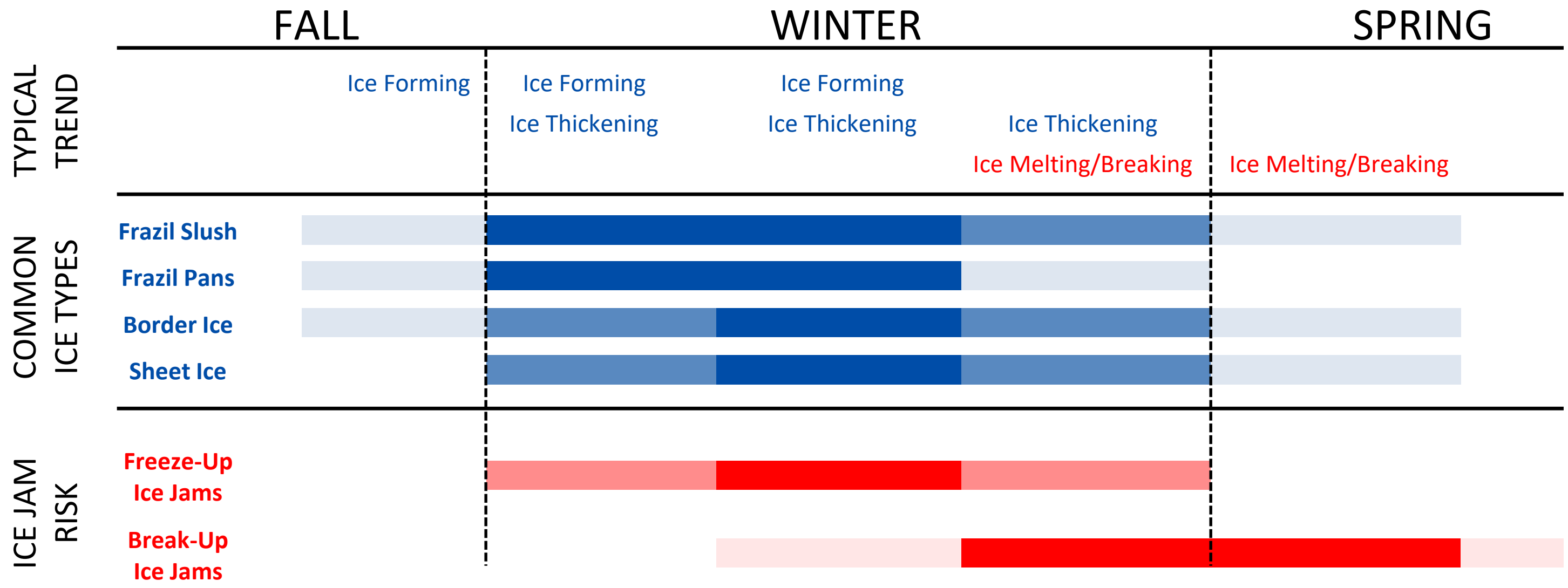
Typical weather conditions associated with past ice jams:

- Daily average temperature 20°F or colder
Depends on the river, can range from 5°F to 20°F
- Accumulated freezing degree days 50 or greater
Depends on the river and type of ice jam, can range from 50 to 500
- *Significant river rise after low water levels have frozen in place*
- *Elevated river levels heading into first major cold wave*



River Ice Spotter Network Training Information

River ice season progression

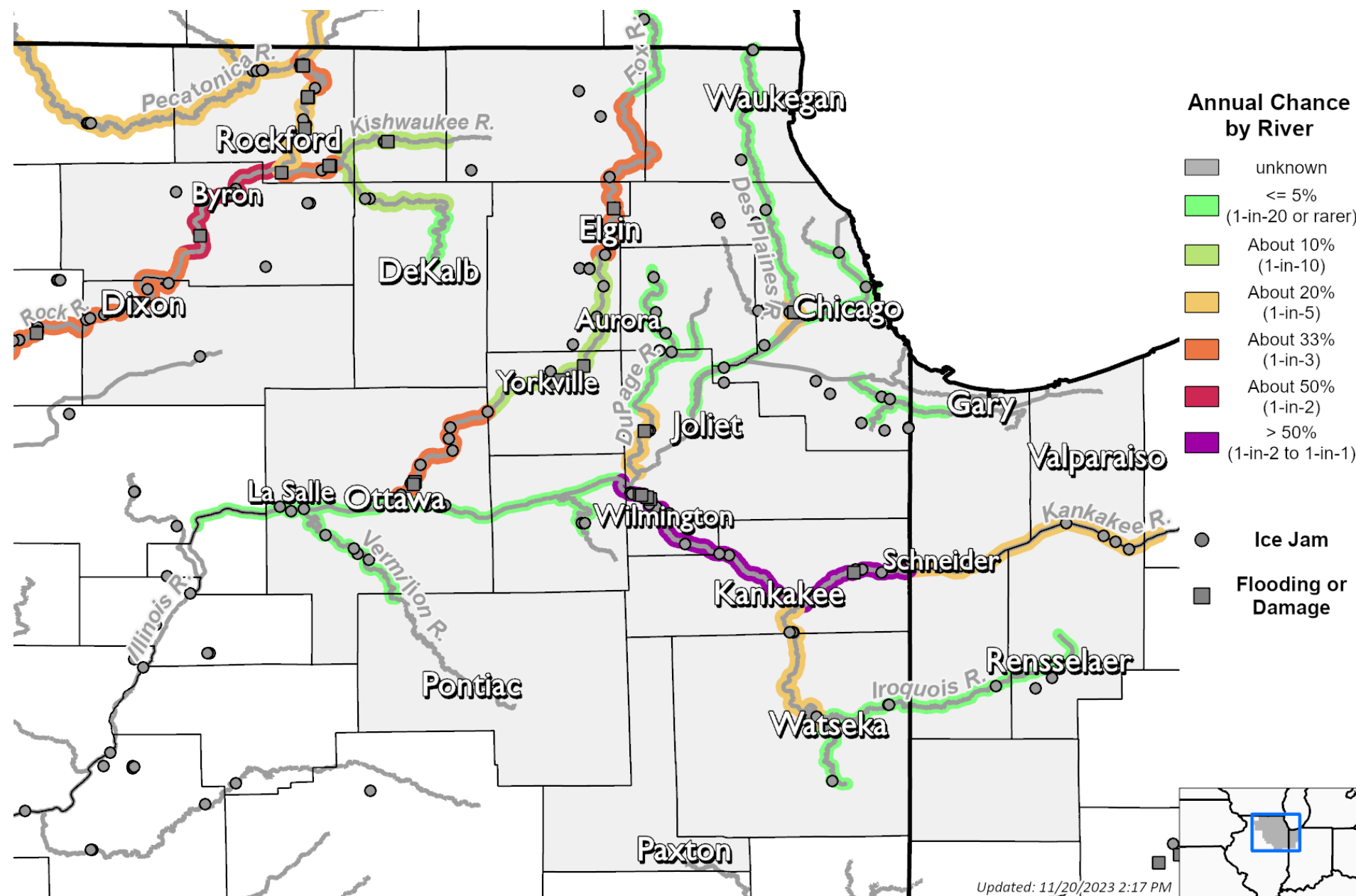


**Each winter is different, and river ice may not follow the typical pattern.*



River Ice Spotter Network Training Information

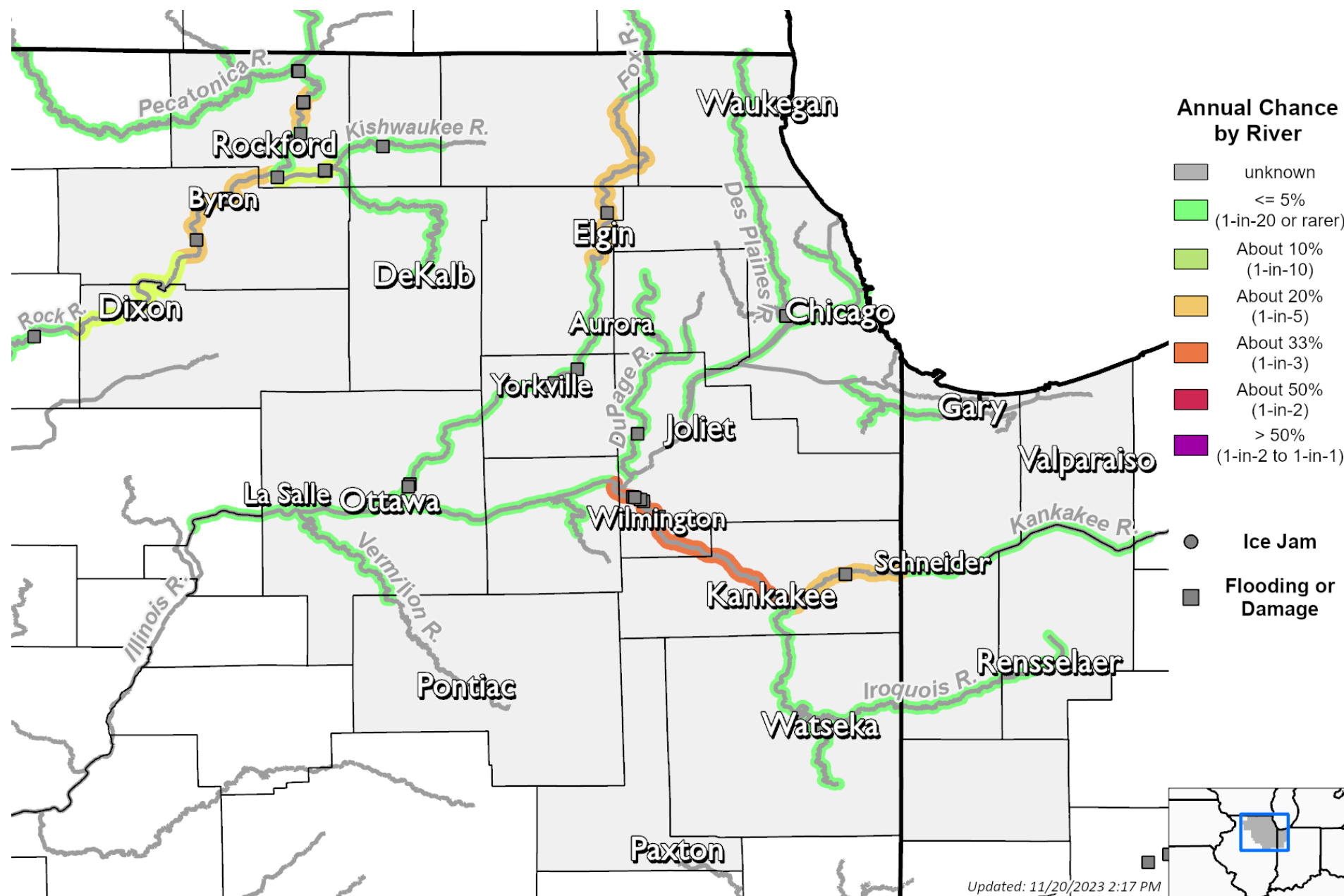
Yearly ice jam risk





River Ice Spotter Network Training Information

Yearly ice jam flood risk



River Ice Spotter Network Training Information

How do we forecast ice jam potential?



River Ice Spotter Network Training Information

How do we forecast ice jam potential?

- Create database of past ice jams and associated weather & river conditions. Reports of river conditions from spotters vital for this database.
- Monitor current/forecasted weather conditions for similarities to range of past conditions associated with ice jams.
- Higher number of weather & river conditions associated with ice jams expected means higher likelihood of river ice and ice jams.



River Ice Spotter Network Training Information

How do we forecast ice jam potential?

What are the limitations of ice jam forecasting?

- Ice jam forecasts are heavily based upon past conditions.
- Typically cannot forecast:
 - Exact location of where ice jam will occur
 - Exact time ice jam will begin or end
 - Exact severity of an ice jam
- Large component of ice jams is random.

River Ice Spotter Network Training Information

River ice types



River Ice Spotter Network Training Information

River ice types

Frazil Slush



Frazil Pans / Pancake Ice



Anchor Ice



Image Credits: USACE CRREL, New Brunswick Ice Manual, USACE CRREL, USACE CRREL

Frazil slush

Fine, small, needle-like structures or thin, flat, circular plates of ice suspended in water. Often resembles slush.

Frazil pans / Pancake ice

Circular, flat pieces composed of frazil and slush ice with a raised rim; the shape and rim are due to repeated collisions.

Anchor ice

Submerged ice attached to the river bed.



River Ice Spotter Network Training Information

River ice types

Sheet Ice



Border Ice



Candled Ice



Image Credits: USACE CRREL, Doug Hoyt, USACE CRREL, Dennis Kalma, USACE CRREL

Sheet ice

A smooth, continuous ice cover formed by freezing (lakes), or by the accumulation of ice floes into a single layer (rivers).

Border ice

Ice formed along and fastened to the shore. Border ice does not extend across the entire width of the river. Also called shore ice.

Candled ice

Decayed sheet ice that assumes the appearance of thin vertical crystals shaped like candles.



River Ice Spotter Network Training Information

River ice accumulation

- After rapid onset of cold, frazil ice typically forms first as floating slush on open rivers.
- Frazil slush combines into floating pans of ice (sometimes called pancake ice), which may eventually accumulate into sheet ice.
- As cold weather continues, ice thickens in place.



River Ice Spotter Network Training Information

River ice accumulation

Flowing river ice may accumulate at the common trouble spots:

- Near river banks or areas of tranquil water
- Change in slope from steep to mild
- Near constrictions (such as bridges), obstructions (such as islands), or sharp meanders/bends
- Downstream of rapids or dams



River Ice Spotter Network Training Information

River ice accumulation

Ice cover examples



~30% ice cover
Frazil ice pans/pancake ice



~60% ice cover
Border ice/sheet ice



~100% ice cover
Water and ice in overbank areas
indicates flooding due to an ice jam

River Ice Spotter Network Training Information

River ice melt and breakup



River Ice Spotter Network Training Information

River ice melt/break-up

River ice melt

- Ice cover melts in place, no flash floods
- Water on ice, debris on ice, or otherwise darker ice color may increase melting
- Open water areas absorb sunlight and help warm water temperatures



Image Credit: Unknown



River Ice Spotter Network Training Information

River ice melt/break-up

River ice break-up

- Increase in river flow breaks up ice cover
River rise about 1.5-3.0x ice thickness typically required
- Broken-up ice cover may flow downstream, get stuck in place, leading to ice jam and flash flooding
- Lower water levels at freeze-up may lead to ice jams in unexpected places



Image Credits: Unknown, NWS Caribou



River Ice Spotter Network Training Information

Ice jams

Freeze-up Ice Jam

- Early-to-mid season
- Frazil ice floes pile up
- Flash flooding unlikely; slow-onset flooding possible



Image Credit: Unknown

Break-up Ice Jam

- Mid-to-late season
- Sheet ice breaks into chunks which move downstream then get stuck
- Flash flooding possible upstream and downstream of jam



Image Credit: USACE CRREL



River Ice Spotter Network Training Information

Ice jams

Freeze-up Ice Jam

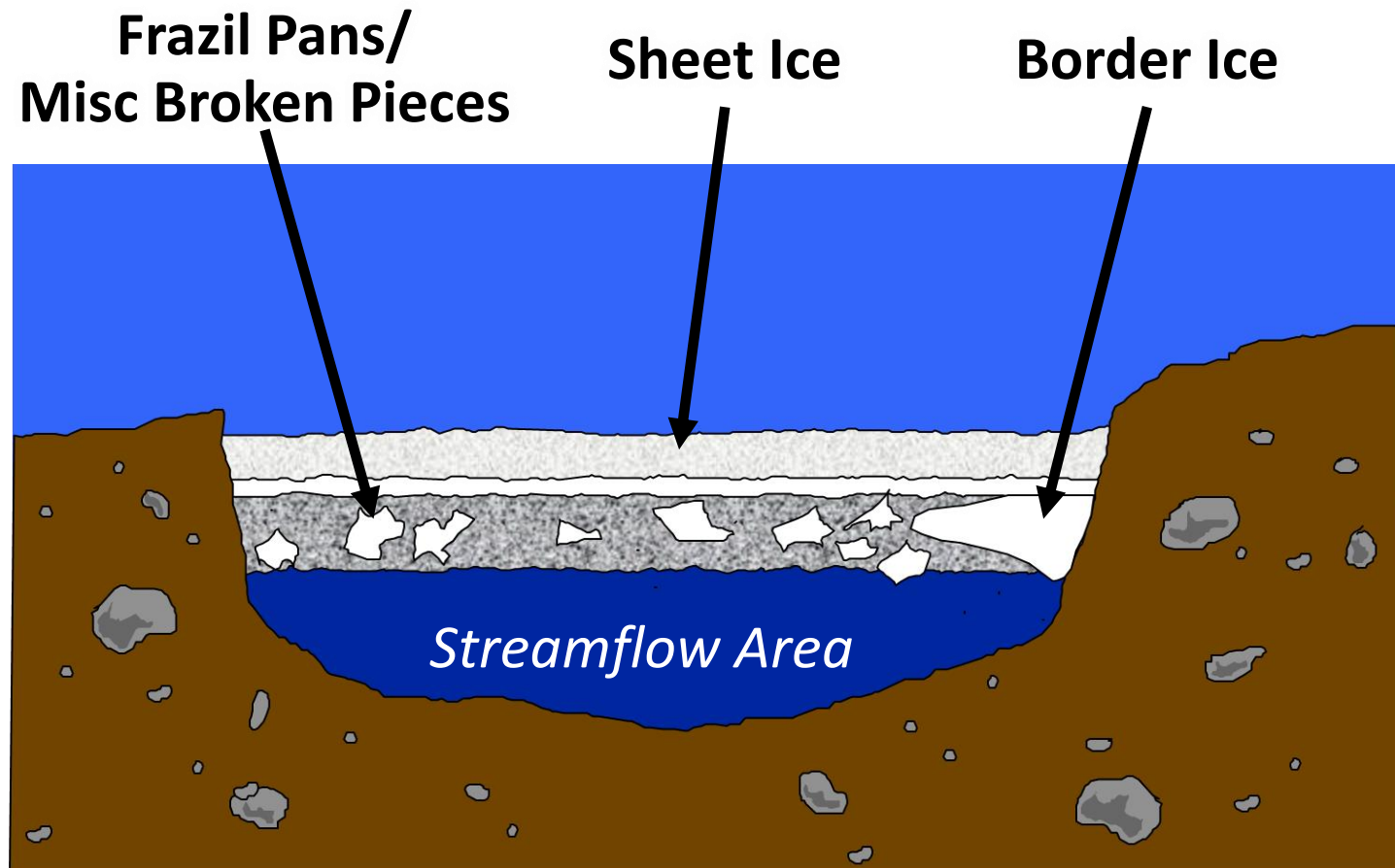


Image Credit: Steven Daly, USACE CRREL

Break-up Ice Jam

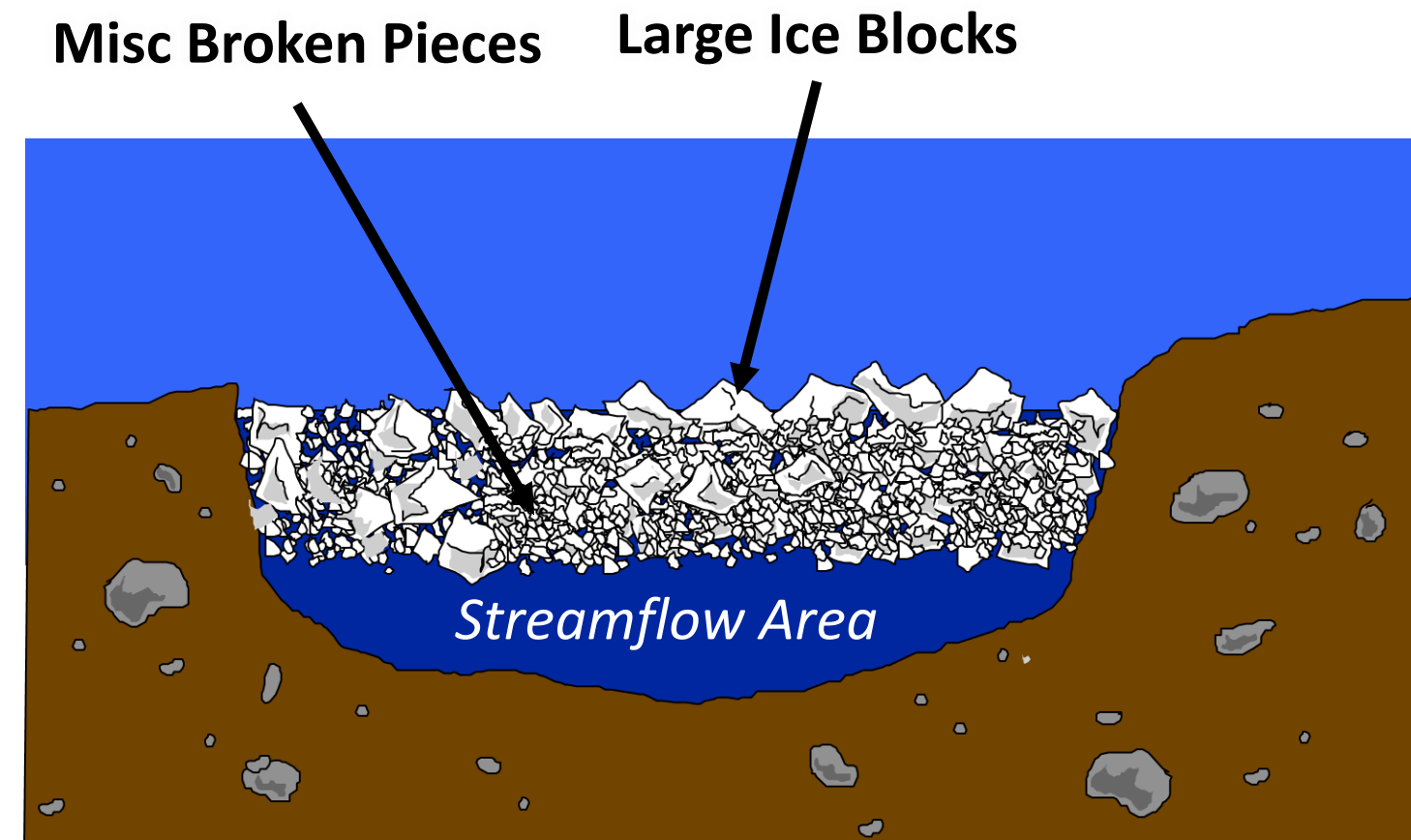


Image Credit: Steven Daly, USACE CRREL



River Ice Spotter Network Training Information

Ice jams

Freeze-up Ice Jam due to river constriction

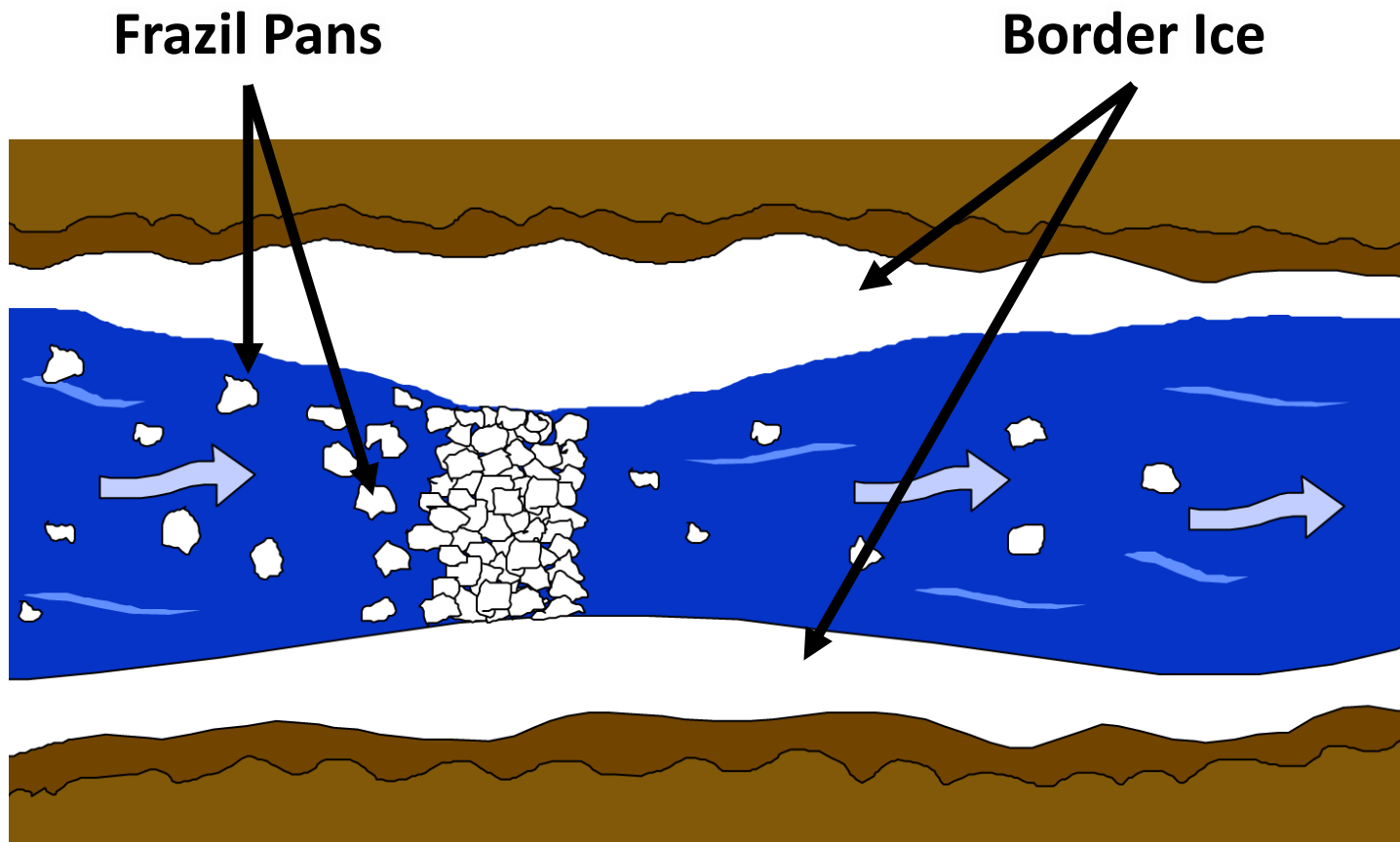


Image Credit: Steven Daly, USACE CRREL

Break-up Ice Jam against sheet ice

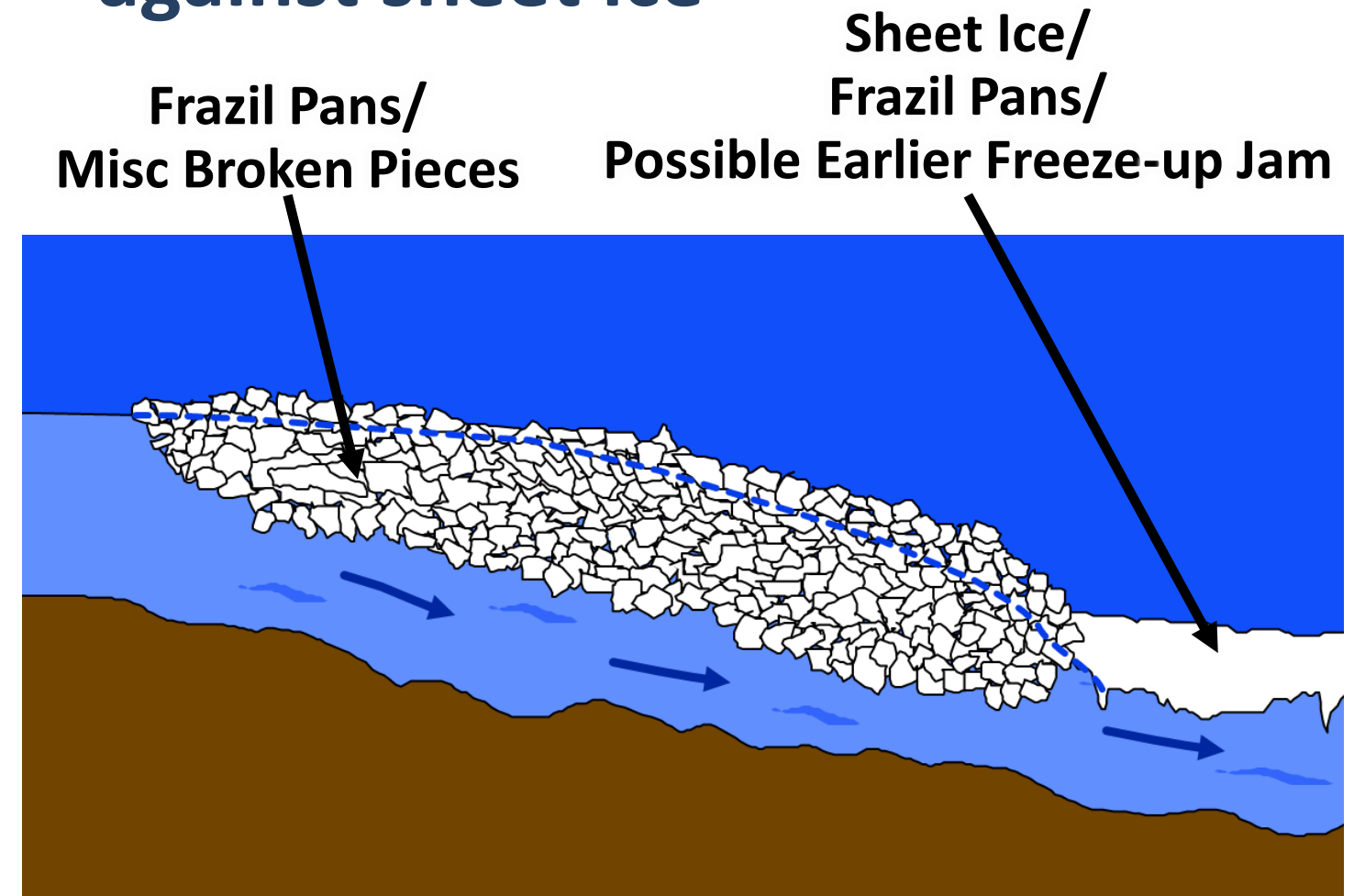


Image Credit: Steven Daly, USACE CRREL



River Ice Spotter Network Training Information

River ice break-up



Example of river ice breakup

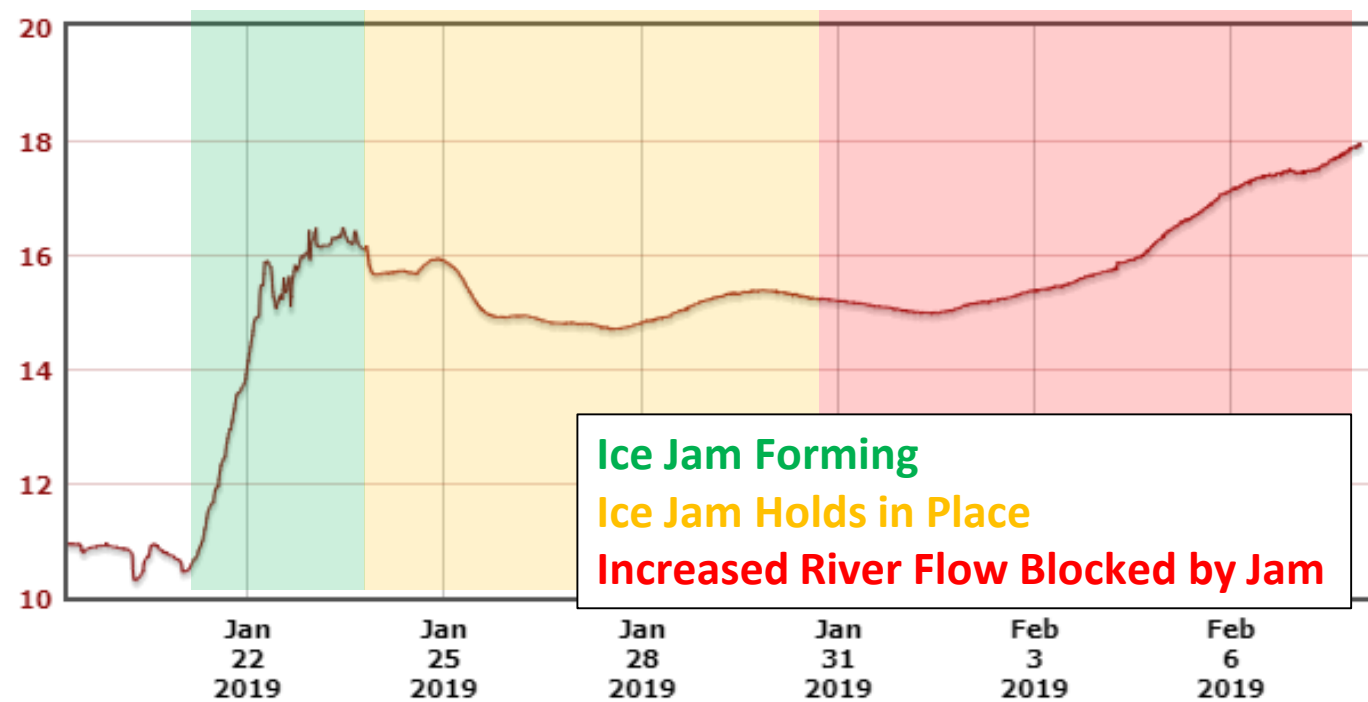
1. Prior to river rise, sheet ice in place
2. River rises due to increased streamflow
3. River rise breaks up sheet ice cover
4. River ice moves downstream; large blocks of sheet ice and possibly shear walls left behind on banks



River Ice Spotter Network Training Information

Ice jams

Ice jams on a river gauge



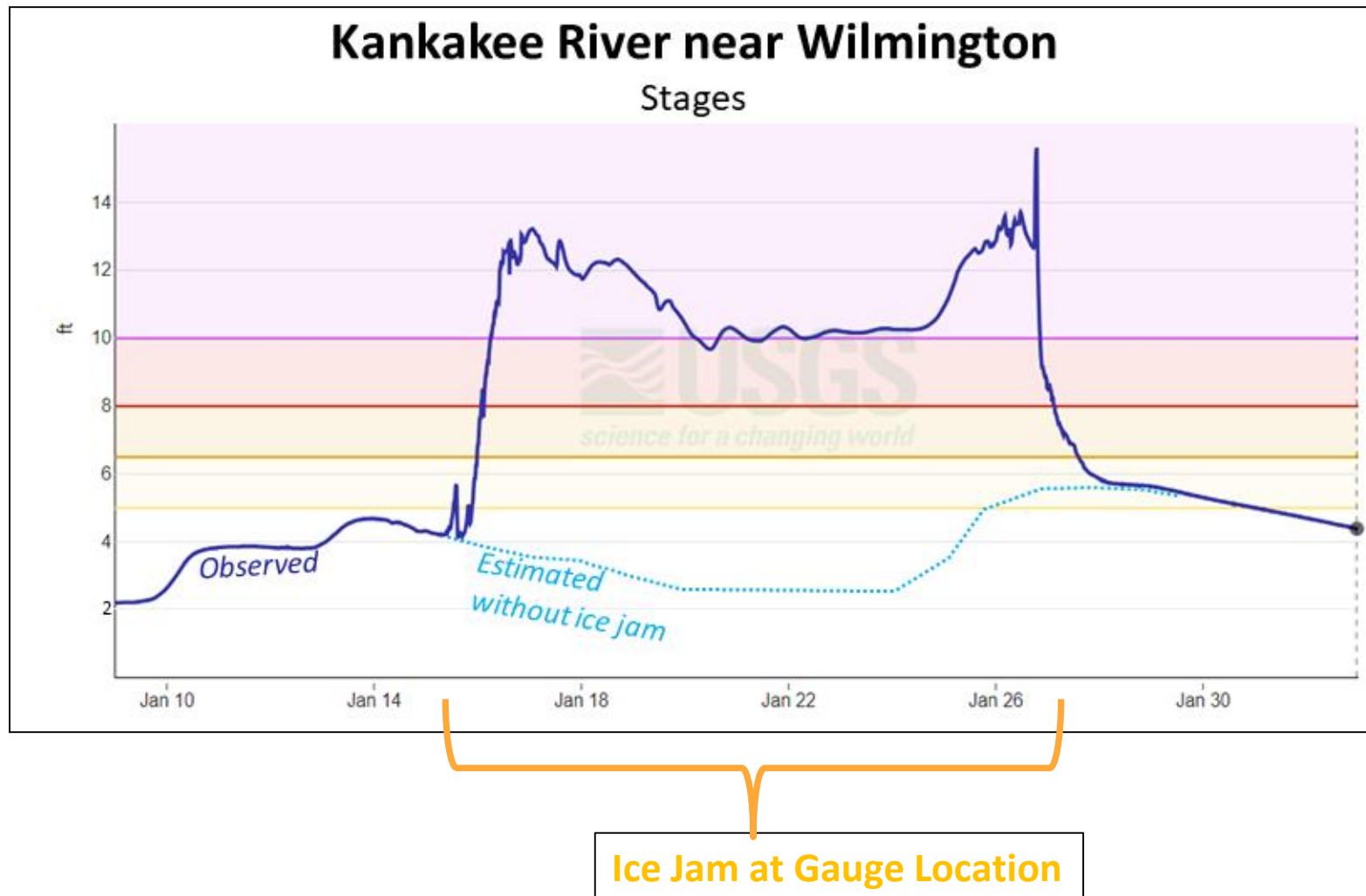
- Ice jam forms near gauge and holds in place for many days
- Increased streamflow from upstream is blocked by the jam and causes additional river rise



River Ice Spotter Network Training Information

Ice jams

Ice jams on a river gauge



- Ice jam forms near gauge causing rise in water levels
- Ice jam remains in place for almost 11 days
- Ice jam breaks up quickly

River Ice Spotter Network Training Information

River ice spotter procedures



River Ice Spotter Network Training Information

River ice spotter procedures

What to report:

- River ice cover
- River ice type(s)
- Trend in ice cover (increasing/decreasing)
- Whether or not ice jam or flooding is occurring



River Ice Spotter Network Training Information

River ice spotter procedures

When to report:

- Weekly on Monday by 9:00 AM
Reports not submitted by 9:00 AM will still be available to NWS forecasters, but may not show up in our weekly ice summary.
- Times when significant changes in river ice occur
- Times when ice jams or flooding are observed

What about times when the river is ice free?

Still send us a report!

A report of no ice cover is still a valid report. Knowing that a river or portion of a river is ice free is just as important as knowing where ice is occurring.



River Ice Spotter Network Training Information

River ice spotter procedures

How to report:

- Typical conditions....
River ice spotter web form (URL sent in confirmation email)
- Flooding, ice jams, or significant ice changes...
Call NWS Chicago/Rockford office (number sent in confirmation email)



River Ice Spotter Network Training Information

River ice spotter procedures

Your Spotter ID

The ID sent to you at the beginning of the winter season. If you are observing ice away from your usual location enter “NA” instead of your spotter ID.

NOTE: Follow “XX=NN” format exactly, or your report may be delayed.

Your Spotter ID *

Format: XX-N or XX-NN. Using a different format may delay the receipt of your report. Remember to enter "NA" if you are reporting away from your usual location.

Your answer

Date of Observation

The date ice was observed. Not necessarily the date that you are entering information into the web form.

Date of observation *

If observation was not made recently (just prior to this report submission), please provide details in the remarks.

Date

mm/dd/yyyy



River Ice Spotter Network Training Information

River ice spotter procedures

River/Creek

The waterway on which ice is observed. If your waterway isn't listed, select "other" and mention in "location" or "remarks."

River/Creek *

Choose

Location

General location of ice observation, such as nearby bridge, park, neighborhood, or town. Use this box to indicate location if you are making an observation away from your usual location, or if the river/creek name isn't listed.

Exact address or latitude/longitude is not necessary, especially if you are reporting from your usual location.

Location *

Description of where the river was observed. Example: Main Street Bridge, City Park. This is especially important if you are observing away from your usual location.

Your answer



River Ice Spotter Network Training Information

River ice spotter procedures

River Condition

General description of ice cover (if any). Open is approximately 0-20% cover, partly frozen is approx. 20-80% cover, and frozen over is approx. 80-100% cover.

River Condition *

Open is approximately 0-20% ice cover. Partly frozen is approximately 20-80% ice cover. Frozen over is approximately 80-100% ice cover. Ice jam means ice is piling up and restricting streamflow; often this means a jagged or jumbled appearance instead of smooth. Use the river ice guide for assistance.

- ☐ Open
- ☐ Partly Frozen
- ☐ Frozen Over
- ☐ Ice Jam Occurring

Percent Ice Cover

Estimate of the percentage of river covered by ice at the observing location.

NOTE: If ice varies significant between upriver and downriver, enter a rough average. Use "remarks" to note differences in ice cover.

Percent Ice Cover *

Estimated percent of ice cover in channel. If ice cover varies within areas visible from your spotting location, use an average and put details in the remarks.

Choose ▼



River Ice Spotter Network Training Information

River ice spotter procedures

River Ice Trend

General description of the trend in ice cover over last few days (not necessarily change since previous Monday).

River Ice Trend *

Indicate if ice has increased or decreased since the last observation. If the change occurred over a period of time that is different than the typical weekly observations, indicate the period of time in the remarks.

- ☐ Ice Forming
- ☐ No Change
- ☐ Ice Melting or Breaking



River Ice Spotter Network Training Information

River ice spotter procedures

Prevailing Ice Type(s)

General description of the most common types of ice observed. See “River Ice Types” of this training or the reference guide for assistance.

Select all that apply. If multiple types of ice are common in the river, select multiple types.

Prevailing Ice Types (select all that apply)

These would be the most common types of ice you see. Use the river ice guide for assistance. If difficult to determine which ice type is most common, indicate that in remarks.



☐ Frazil Slush



☐ Frazil Pans



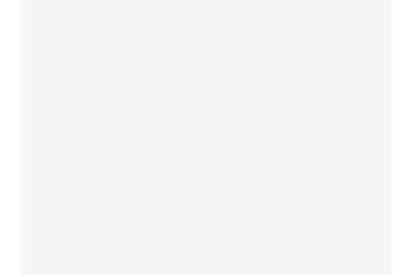
☐ Border Ice



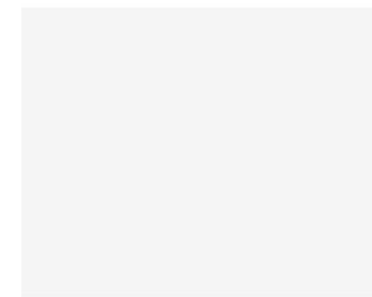
☐ Sheet Ice



☐ Shear Walls on Banks/Shoreline



☐ Nearly Solid Ice Cover - Moving



☐ Nearly Solid Ice Cover - Stuck in Place



River Ice Spotter Network Training Information

River ice spotter procedures

Any ice-related flooding occurring?

Indicate whether or not the stream/river has overflowed its banks related to ice accumulation and/or an ice jam.

Any ice-related flooding occurring?

Provide details about observed flooding, or ice-related damage, in remarks.

☐ Yes

☐ No

Remarks

Leave any additional observations here that you think may be helpful.

NOTE: If you are sending in a report away from your usual location, this is where you would provide your spotter ID, leaving the spotter ID box as "NA."

Remarks

Use this section to provide any additional details that are relevant to your report.
Remember to add your spotter ID if observing away from your usual location.

Your answer



River Ice Spotter Network Training Information

River ice spotter safety

Important Safety Notes

- Always observe river ice from a safe location!
 - Away from the immediate shore
 - Away from vehicle lanes on bridges
- Never venture on to ice to observe conditions.
This provides no additional information and will put your life at risk.

SAFETY FIRST!

All visual observations of ice conditions should be done from a safe location only.



River Ice Spotter Network Training Information

How are ice spotter reports used?

Weekly River Ice Summary

000

FGUS83 KLOT 251626
RVSL0T

HYDROLOGIC STATEMENT
NATIONAL WEATHER SERVICE CHICAGO
1111 AM CDT MON MAR 25 2019

WEEKLY RIVER ICE CONDITIONS

REPORTED BY RIVER ICE SPOTTERS

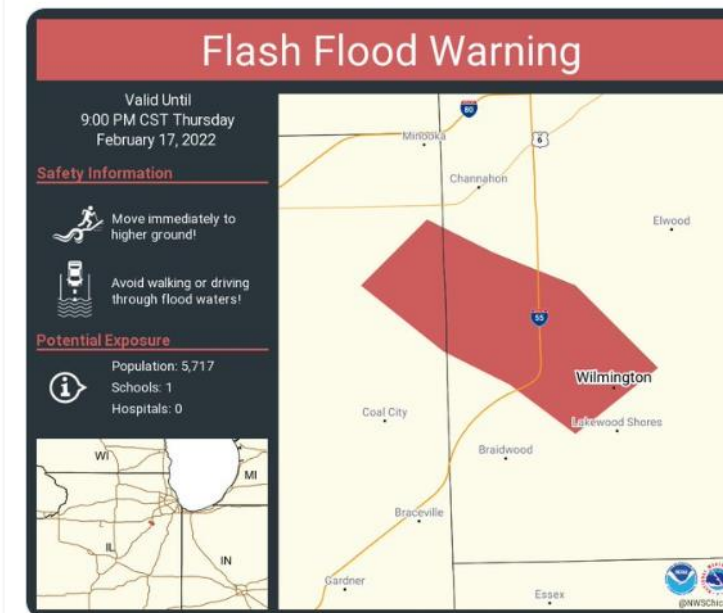
ID	LOCATION	RIVER CONDITION	ICE STATUS	PCT ICE COVER
DES PLAINES RIVER...				
DP-26	LIBERTYVILLE IL	OPEN	NO CHANGE	0
:WADSWORTH RD CROSSING				
DP-19	LIBERTYVILLE IL	OPEN	NO CHANGE	0
:RIVERSIDE PARK				
DP-18	LIBERTYVILLE IL	OPEN	NO CHANGE	0
:OAK SPRING RD SOUTH END OF ADLER MEMORIAL PARK				
DP-17	LIBERTYVILLE IL	OPEN	NO CHANGE	0
:RT 137 BUCKLEY RD				
DP-16	LIBERTYVILLE IL	OPEN	NO CHANGE	0
:RT 120 BELEVIDERE RD				
DP-15	GURNEE IL	OPEN	NO CHANGE	0
:WASHINGTON ST				
DP-14	GURNEE IL	OPEN	NO CHANGE	0
:GRAND AVE				
DP-13	GURNEE IL	OPEN	ICE MELTING	0
:RT. 41 SOUTH END OF COUNTY FOREST PRESERVE				
DP-12	WADSWORTH IL	OPEN	NO CHANGE	0
:WADSWORTH RD SOUTH END WADSWORTH PRAIRIE NATURE PRESERVE				
DP-11	WADSWORTH IL	OPEN	ICE MELTING	0
:RT 173 SOUTH END OF VAN PATTEN WOODS				
DP-10	ZION IL	OPEN	ICE MELTING	0
:RUSSELL RD NORTH END OF VAN PATTEN WOODS				
DU PAGE RIVER...				
DU-9	SHOREWOOD IL	OPEN	NO CHANGE	0
:S RIVER RD				

Flood Watches/Warnings



NWS Chicago
@NWSChicago

Flash Flood Warning including Wilmington IL until 9:00 PM CST



4:24 PM · Feb 17, 2022 from Illinois, USA

11 Retweets 2 Quote Tweets 20 Likes

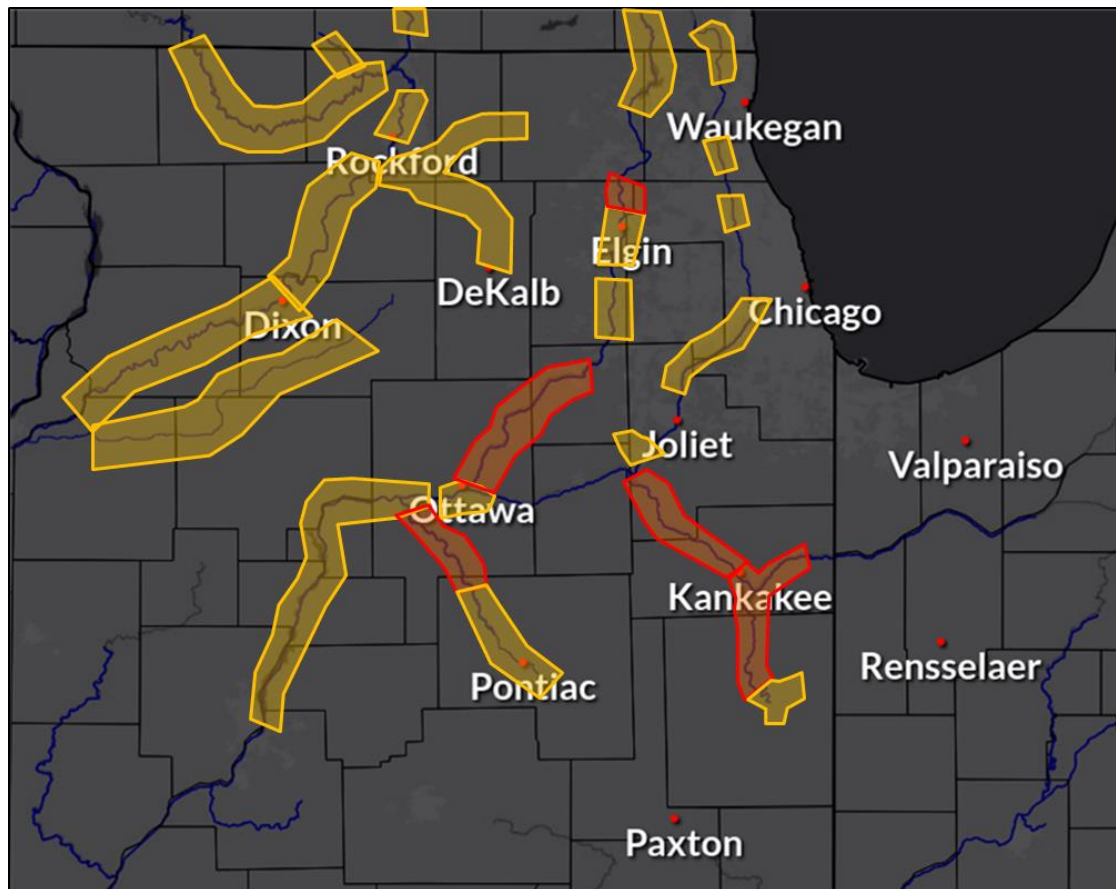




River Ice Spotter Network Training Information

How are ice spotter reports used?

Mapping Ice Conditions

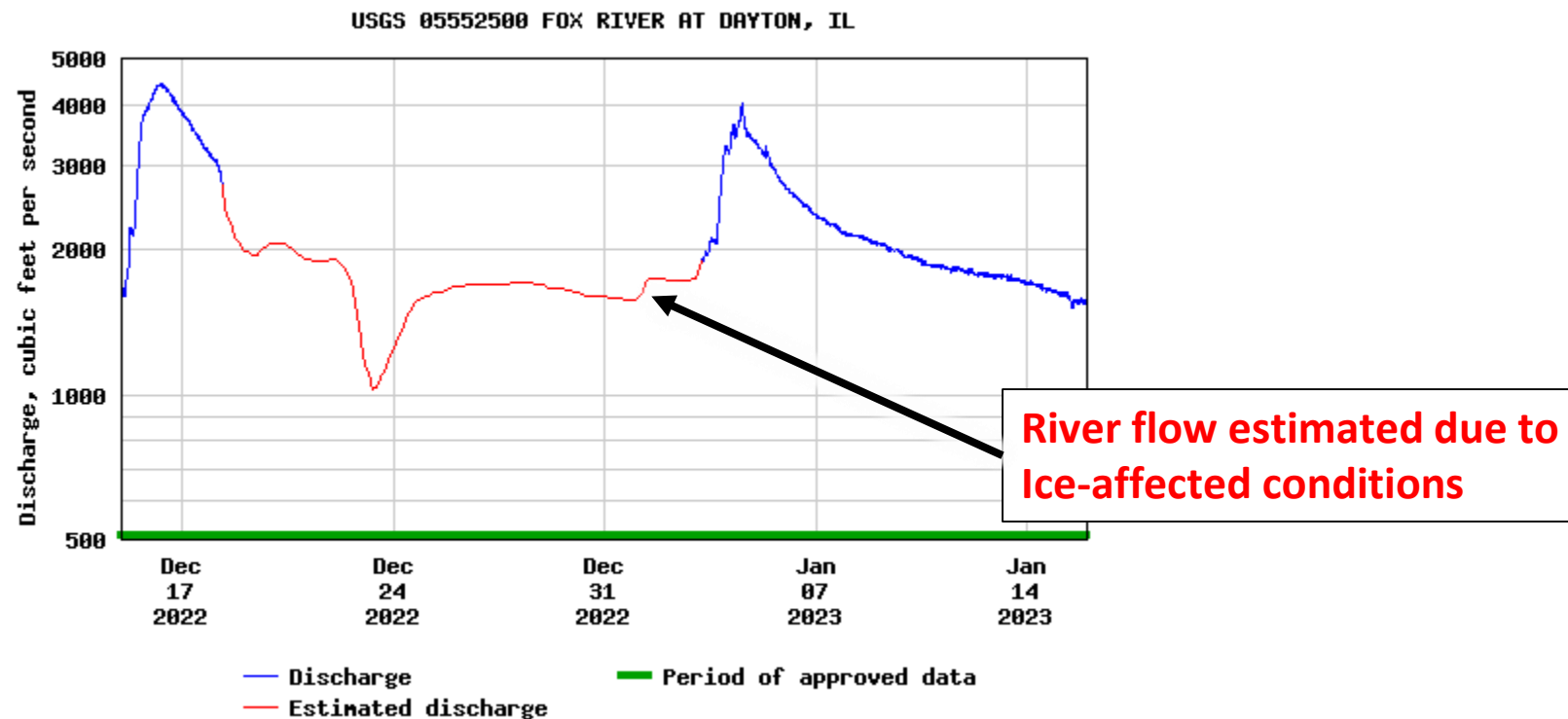




River Ice Spotter Network Training Information

How are ice spotter reports used?

Accounting for Ice-Affected River Flow





River Ice Spotter Network Training Information

Other links and resources

NWS Chicago River Ice Spotter Network page

[www.weather.gov/lot/River Ice Spotter Network](http://www.weather.gov/lot/River_Ice_Spotter_Network)

NWS Chicago Hydrology Program page

[www.weather.gov/lot/hydrology program overview](http://www.weather.gov/lot/hydrology_program_overview)

Latest weather forecasts and warnings

www.weather.gov/lot

Latest river observations and forecasts

water.weather.gov

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Chicago, Illinois