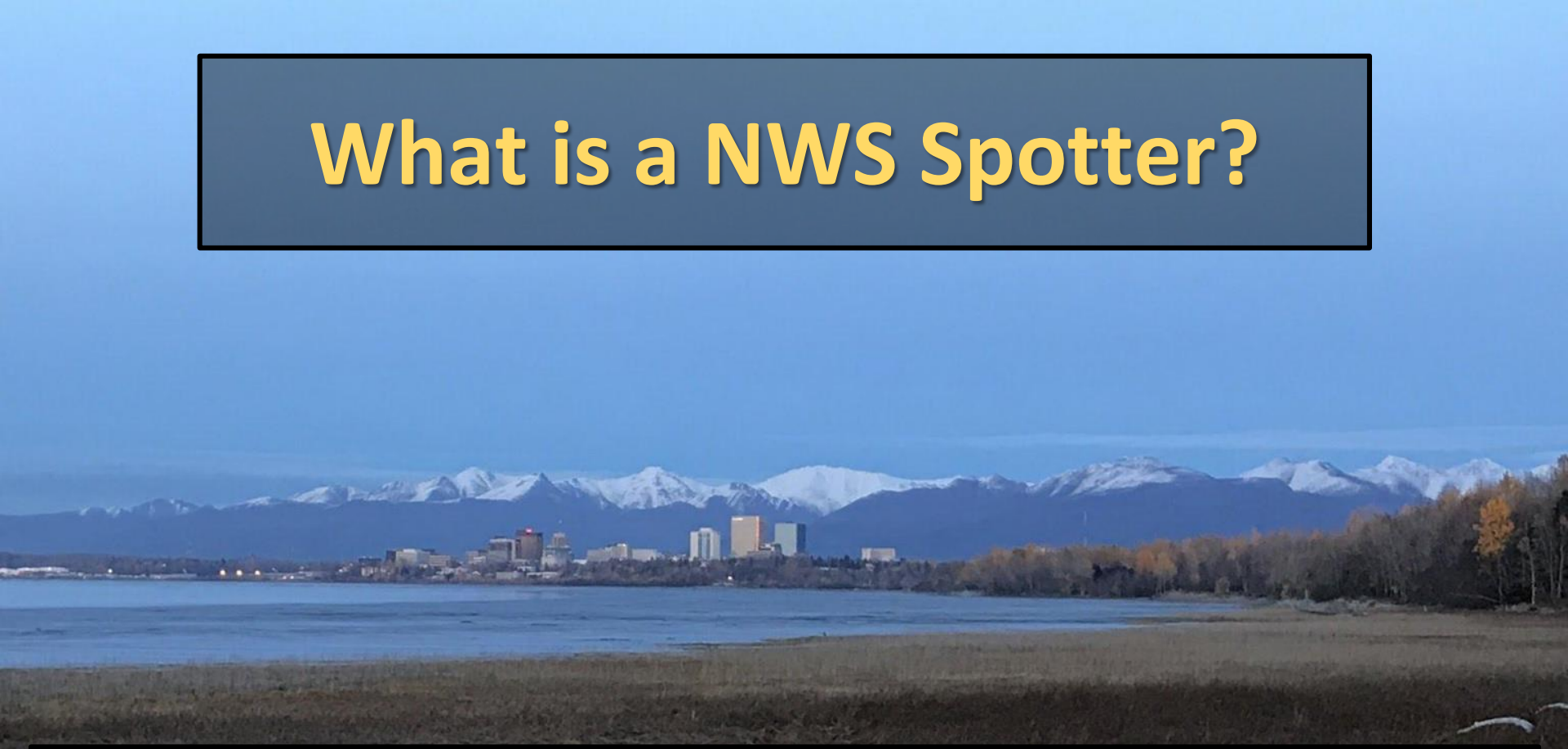
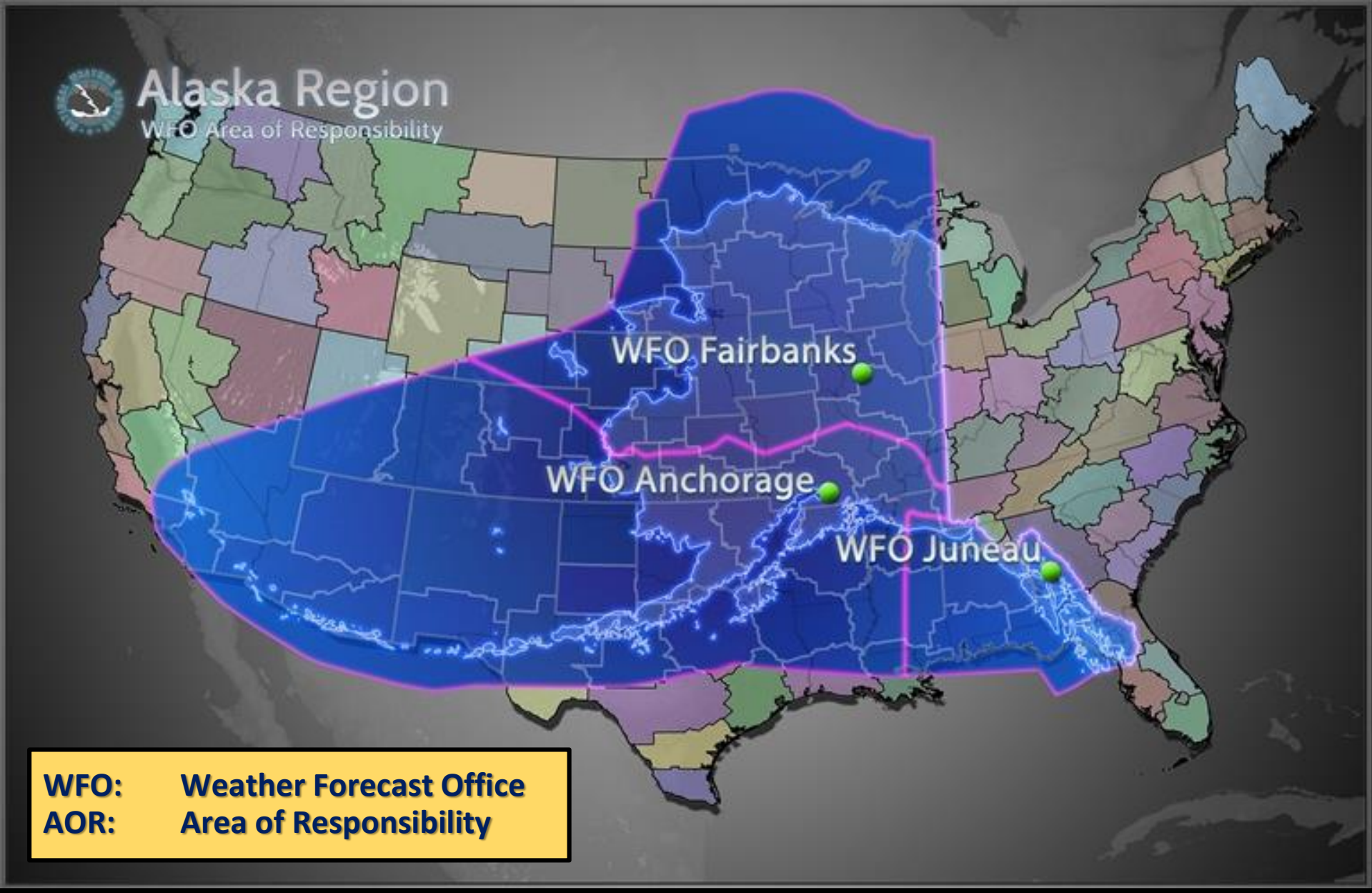
Alaska Weather Spotter Training

Weather Forecast Office Anchorage

What is a NWS Spotter?



A weather spotter is a trained citizen who reports hazardous weather and any impacts being observed within their community.



Why are Weather Spotters Needed?

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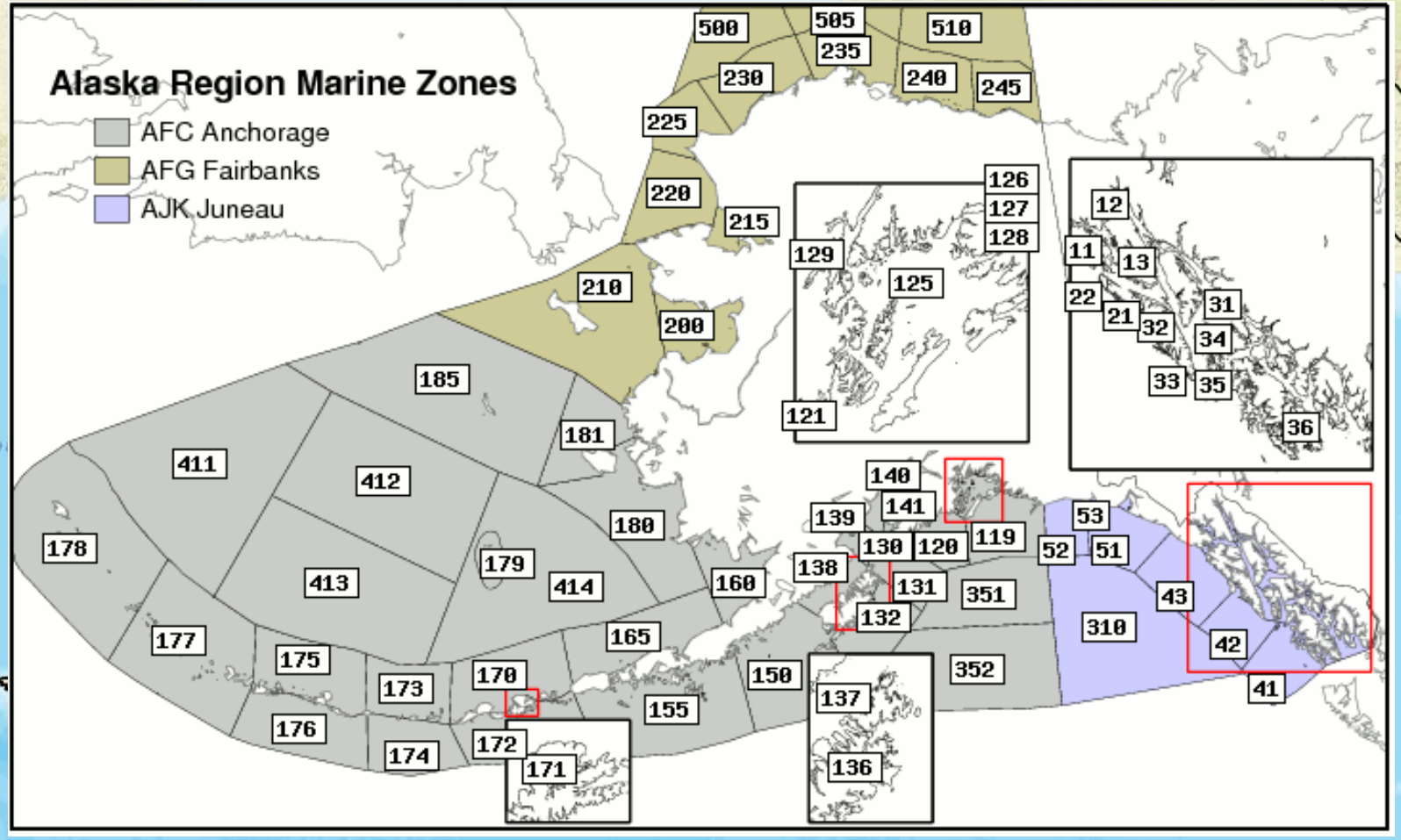


Total forecast area: 1,023,469 mi²
including land, nearshore, and offshore areas

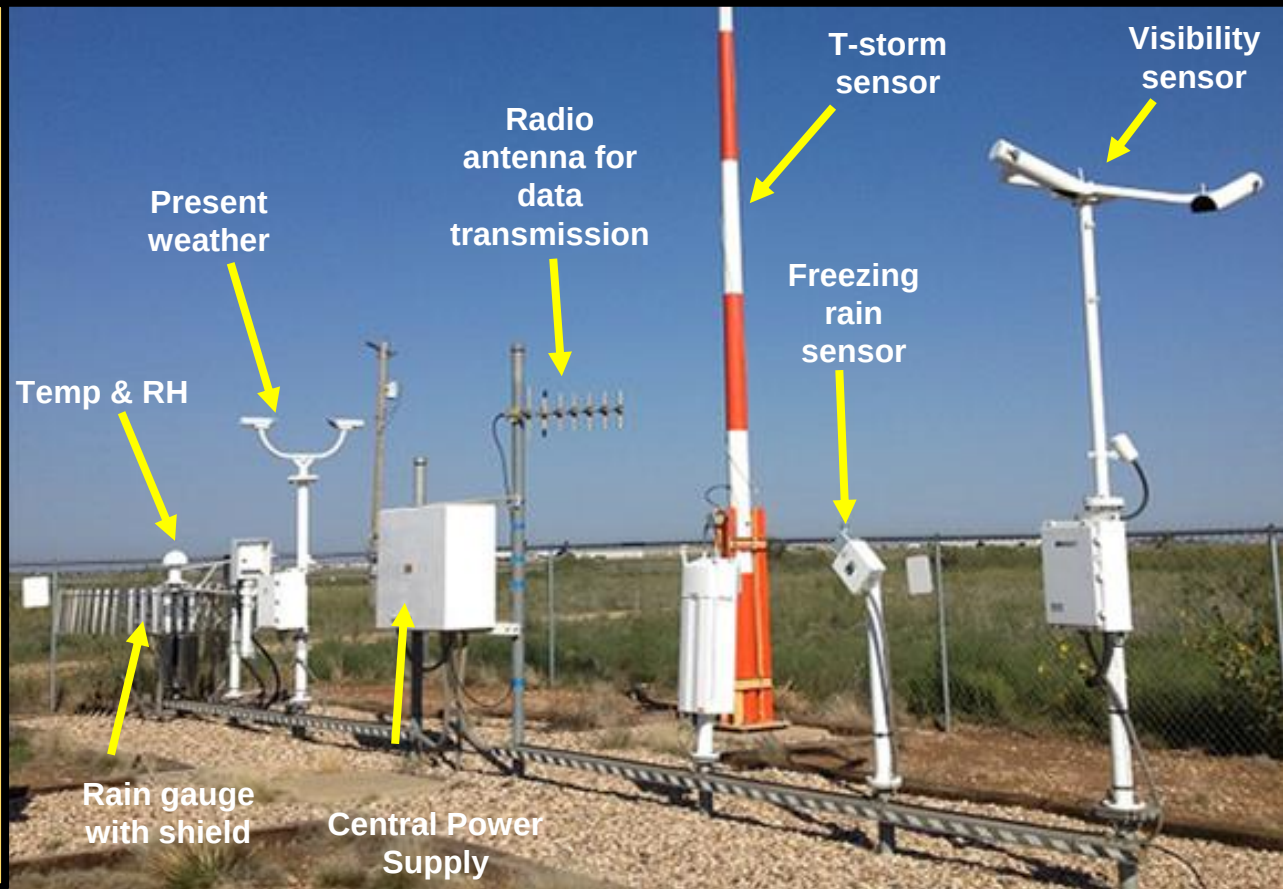
Percentage of AK population: ~70%

Why are Weather Spotters Needed?

Automated weather observations can't detect everything!

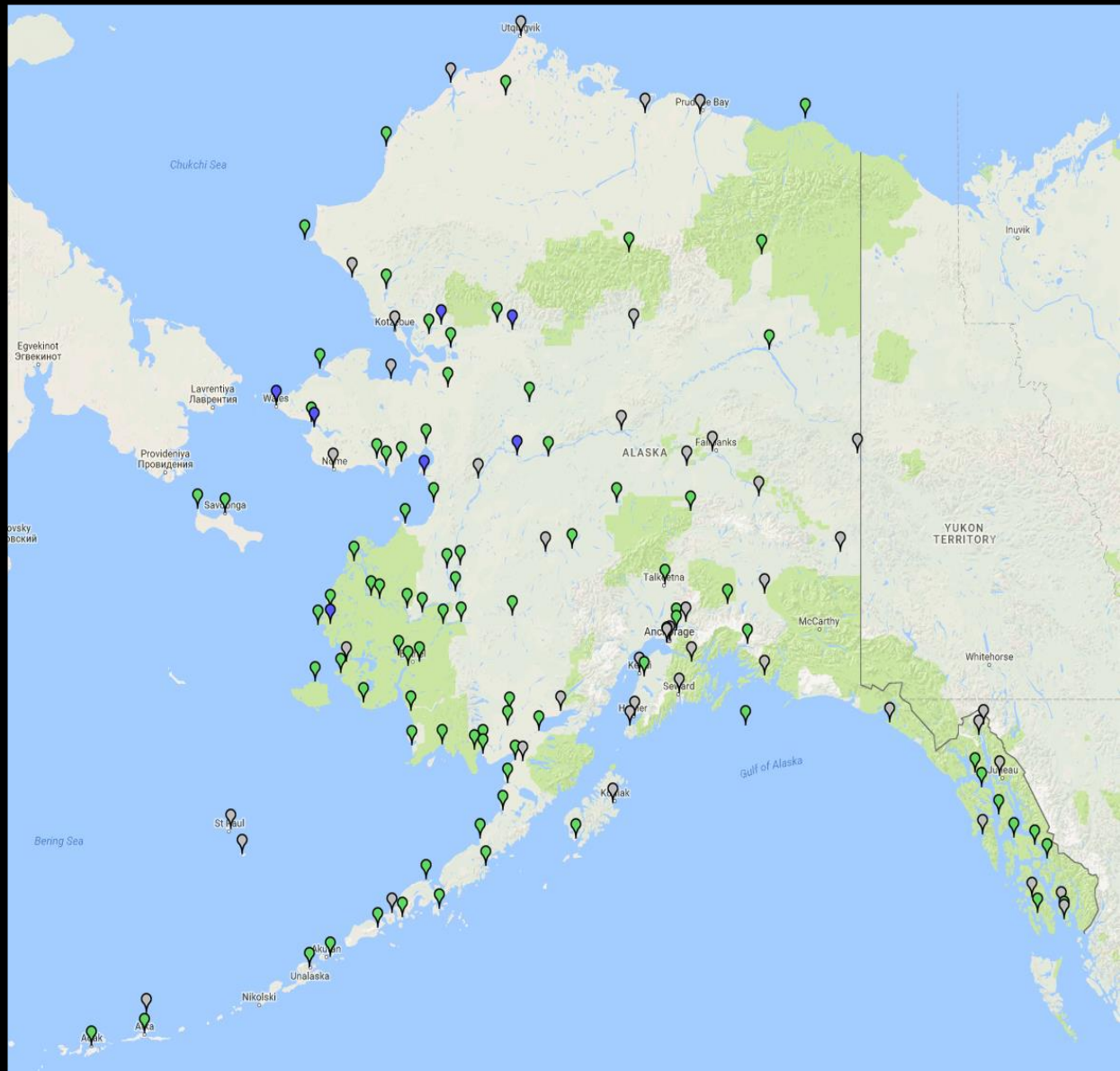
What about…

- Ice accumulation?
- Snow accumulation?
- Hail?
- Waterspouts?
- Tornadoes?

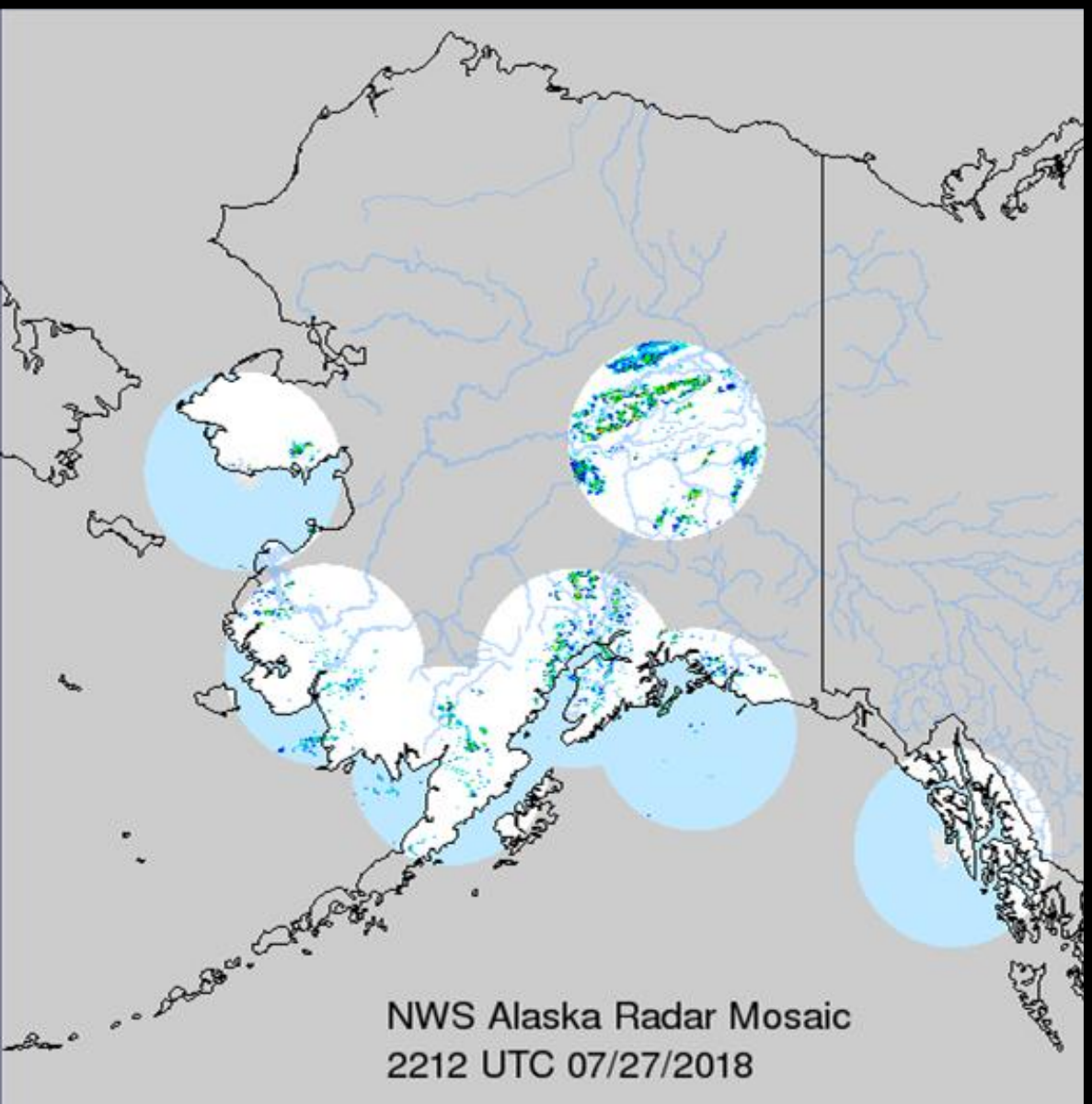


Why are Weather Spotters Needed?

Surface Observations are few and far in between

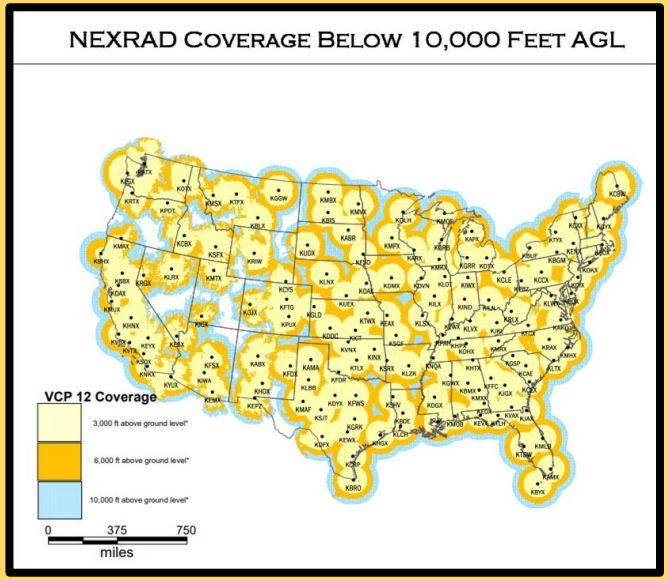


Why are Weather Spotters Needed?



Only 7 radars in the entire state!

Pedro Dome (FBX)
Nome (FBX)
Bethel (ANC)
King Salmon (ANC)
Kenai (ANC)
Middleton Island (ANC)
Biorka Island (JNU)

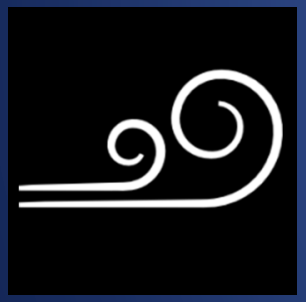


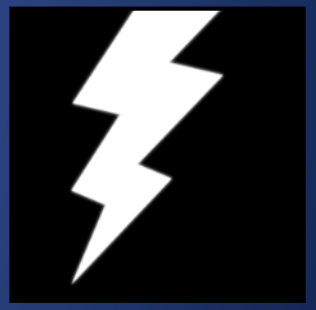
Weather Spotter Safety

- Never attempt to walk or drive over obstructions (e.g., flooded roadways and downed power lines)
- Be aware of objects that have the potential to fall or be blown over due to severe weather.
- **The spotter's personal safety is the primary objective of every spotter.**
- Always obey federal, state, and local laws and directives from public safety officials.

A spotter should NEVER put themselves in harm's way.

Types of Weather To Report





- Snow
- Freezing Rain/Icing
- High Winds
- Heavy Rain
- Flooding and River Ice
- Thunderstorms
- Lightning
- Funnel Clouds
- Hail

Snow

Snow

Description:

- Precipitation in the form of ice crystals, mainly of intricately branched hexagonal form and often agglomerated into snowflakes formed directly from the freezing of water vapor in the air

Impact:

- Poor driving conditions
- Avalanches
- Roof collapse

How to Measure Snow

A snow-board is a simple 2ft x 2ft elevated table with a flat white top to minimize melting.

A snow-board or table works well!

Be sure it is located away from trees, buildings, fences, etc.

Meteorologist measuring snowfall on our snow-board at the NWS Anchorage Office

How to Measure Snow

- Measure and record snowfall to the nearest tenth of an inch.

- Measurements should be taken every 12 hours & when the snow has stopped falling. A grand total for the storm is very helpful!

- Remember to clear off the snowboard after each measurement!

- If your observation is not based on an exact measurement, please report it as an estimate.

How to Measure Snow

NWS meteorologist clearing snow table after a measurement

How to Measure Snow

If not using a snow-board, sample several locations in your yard and take an average.

If winds are causing drifting snow, **DO NOT** average in the drifts.

Snow drifts in Saint Paul, Alaska.

Do not *average in drifts like this. Take measurements where the snow is uniform.*

Photo courtesy of Kelly Harris

Reporting Snow

Please specify:

Time the snow started

Amount of snowfall measured since the beginning of the storm

If the snow is still falling

(lightly, moderately, or heavily?)

Is the snowfall impacting visibility?

Measurement or estimate

We love pictures!!!

When to Report Snow

- If heavy snow is falling, it's very helpful to give us reports throughout the duration of the storm rather than wait until the storm is over to send in your first report.
- We can always use snowfall reports, even if the snow is not particularly heavy. If it's impacting your community or roads, we'd like to know about it.

Weather.gov/Juneau

Actions to Take: Snow

Going Outdoors

- Dress in layers for cold temperatures
- Don’t overexert yourself when shoveling snow

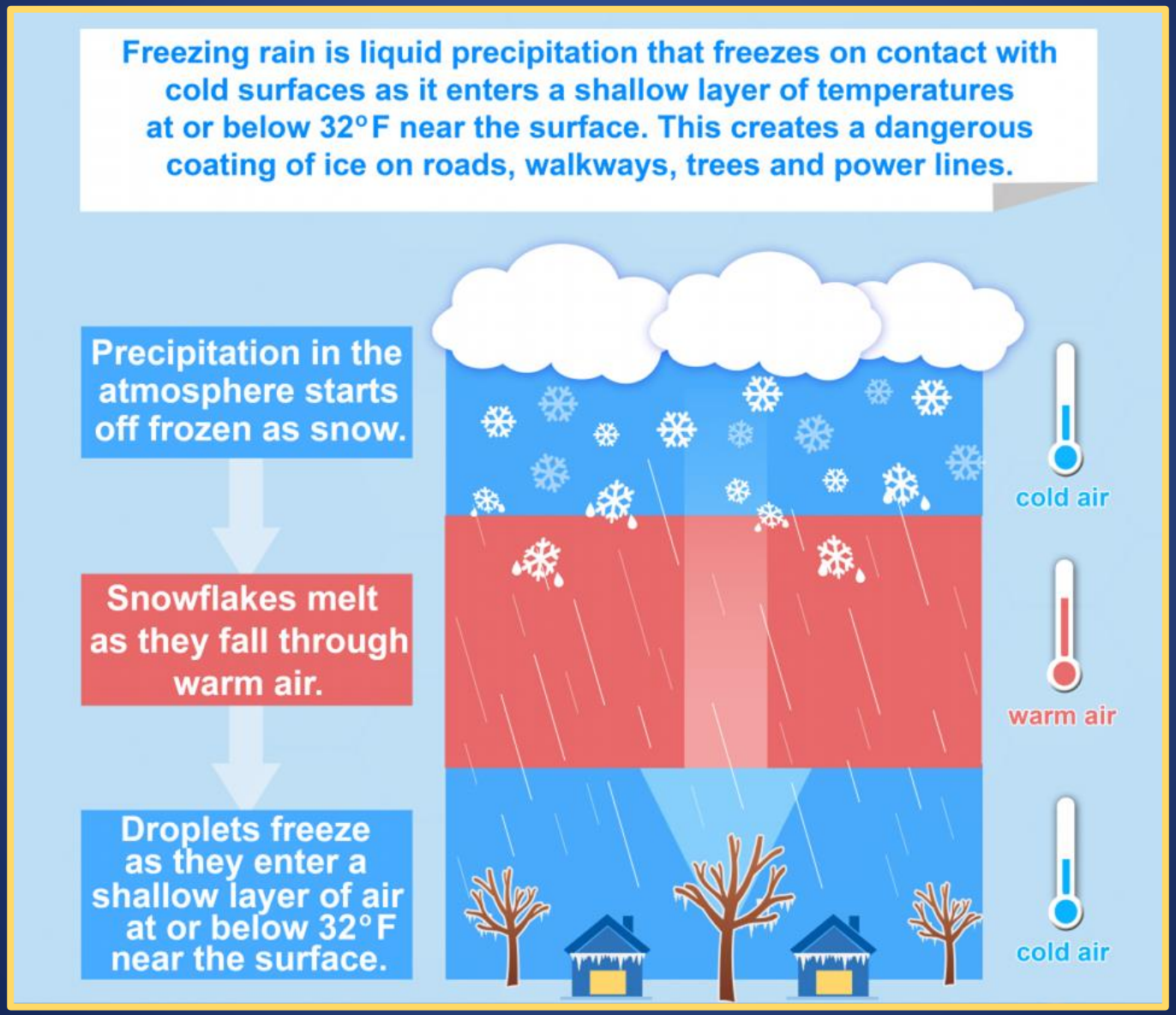
Traveling

- Slow down and take caution while driving; leave extra space between vehicles
- Pack a vehicle preparedness kit
- Keep windows clear of snow

Freezing Rain

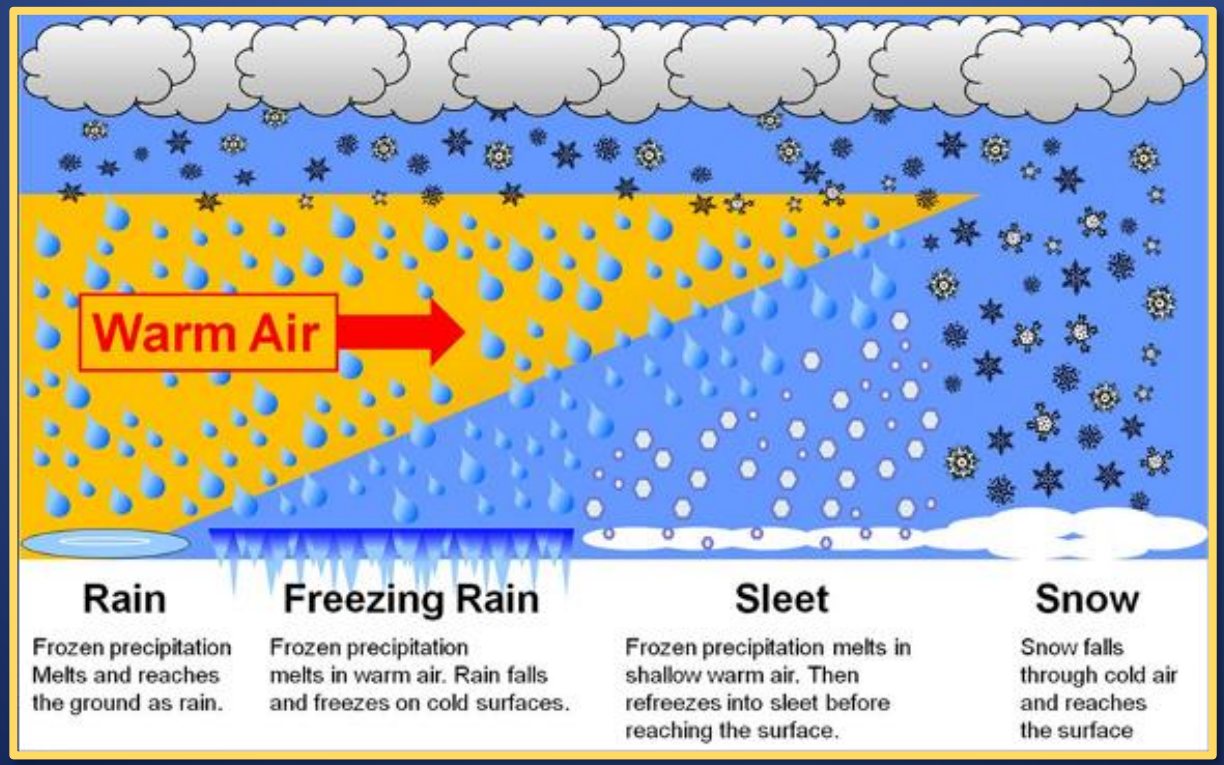
Freezing Rain

Freezing rain is liquid precipitation that freezes on contact with cold surfaces as it enters a shallow layer of temperatures at or below 32°F near the surface. This creates a dangerous coating of ice on roads, walkways, trees and power lines.



Freezing Rain and Sleet

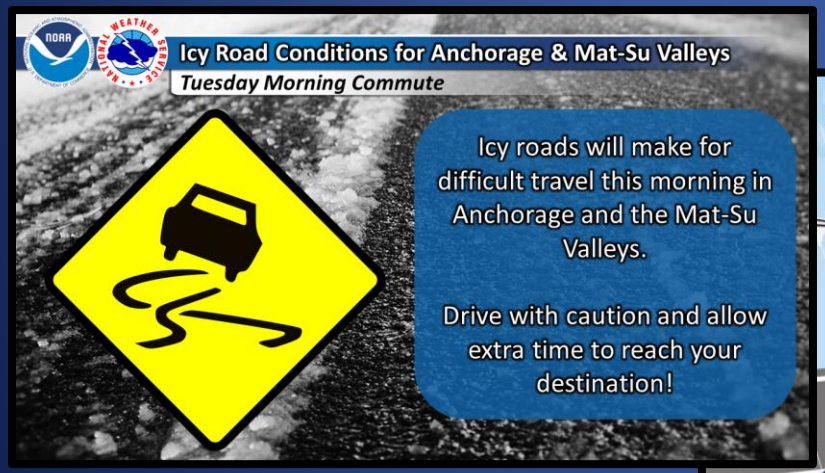
Description: Both freezing rain and sleet occur by the same general process. Liquid raindrops in a layer of warm air well above the surface fall into a layer of freezing air near the surface. The difference between these two types depends on the thickness of the layer of freezing air.

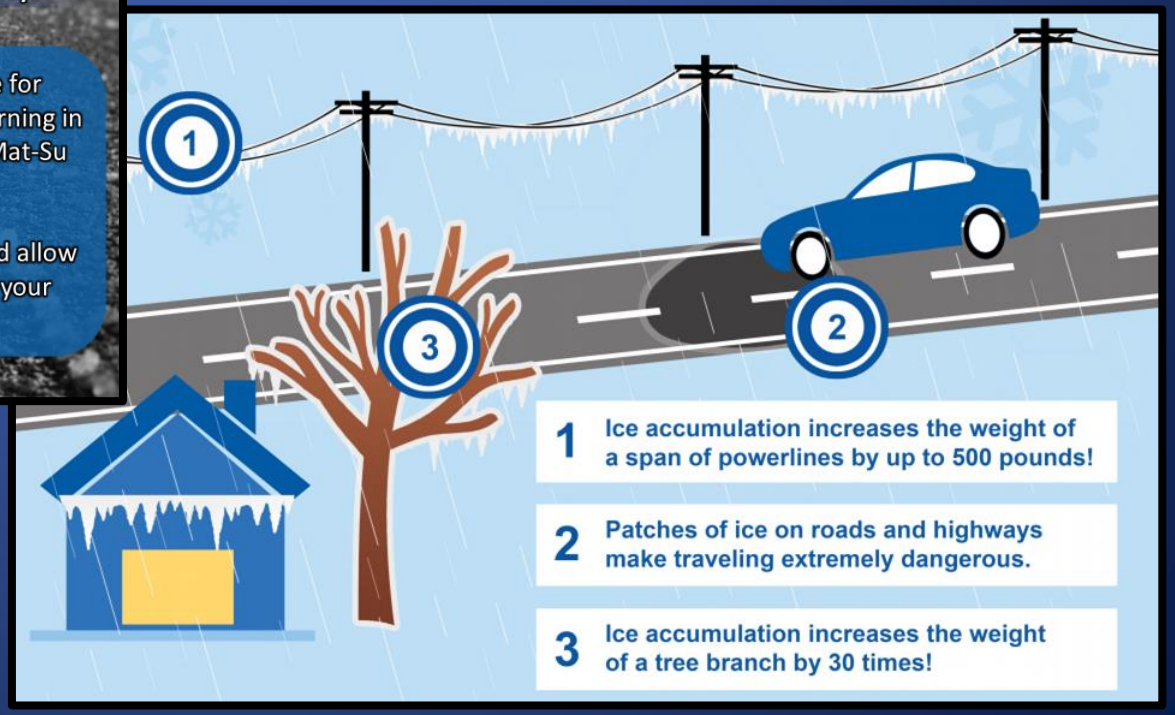


Weather.gov/rnk

Impacts of Freezing Rain

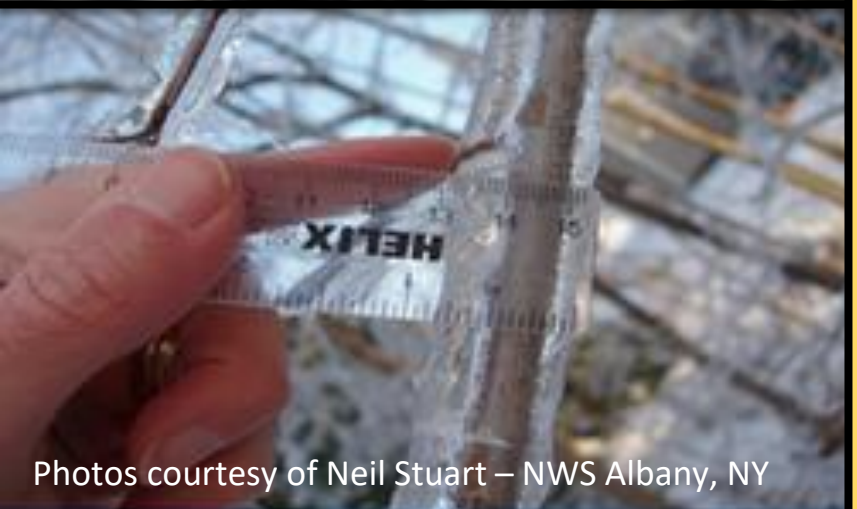
- Slick roads cause accidents (Glenn Highway commute)
  - Anchorage School District closing
  - Downed trees & power lines





How to Report Freezing Rain

Please include:



Photos courtesy of Neil Stuart – NWS Albany, NY

Time the freezing rain started

Hazardous road conditions resulting from the frozen precipitation

Damage caused by the icing, including downed tree branches or power lines

An estimate of the ice thickness. Use a ruler and average the ice thickness on a branch

Actions to Take: Freezing Rain

- Check local weather conditions.
- If you encounter sleet or freezing rain, **drive extremely cautiously**.
  - Even 4-wheel drive vehicles will have difficulty on icy roads. Try to avoid overpasses and bridges if at all possible.
- If the pavement is snow or ice covered, start slowly and brake gently. Begin braking early when you come to an intersection.
  - If you start to slide, ease off the gas pedal or brakes. Steer into the direction of the skid until you feel you have regained traction, and then straighten your vehicle.

High Winds

High Wind Impacts

- Airport closures
- Uprooted trees
- Property damage

Anchorage Hillside - April 24, 2018

Uprooted Tree at Bowman Elementary

Reporting High Winds

- Report high winds, especially if they are damaging trees or property

- In the report, try to include the location and type of wind damage. This helps us to estimate the wind speeds

Winds can be measured by both wind speed and by damage

Tree downed in Ketchikan

>72 mph	= Hurricane Force: Trees snapped, extensive destruction.
64-72 mph	= Large trees uprooted; widespread damage to structures.
55-63 mph	= Small trees uprooted, structural damage can occur.
47-54 mph	= Branches snap; loose shingles removed; minor damage to sheds/barns.
39-46 mph	= Twigs break; wind impedes walking; light objects (lawn furniture) tossed.
32-38 mph	= Whole trees in motion; inconvenience felt walking against wind.
25-31 mph	= Large branches in motion; whistling heard in overhead wires; umbrellas used with difficulty.
19-24 mph	= Small trees with leaves begin to sway.
13-18 mph	= Raises dust and loose paper, small branches moved.
8-12 mph	= Leaves and small twigs in constant motion; wind extends light flag.
4-7 mph	= Wind felt on face; leaves rustle, vanes moved by wind.
1-3 mph	= Direction of wind shown by smoke drift not by wind vanes.
<1 mph	= Calm, smoke rises vertically.

Estimating Wind Speeds

These are the types of questions we will likely ask if you call in a high wind report:

- Are branches snapped? If so, approximately how thick are the branches that snapped?
- Is there any structural damage? What kind?
- Are any trees uprooted?

Actions to Take: High Winds

Before

- Secure, tie down, or put away loose items that could fly away

During

- Take shelter
  - Make sure to avoid an area likely to be hit by fallen trees or power lines
- Take caution when driving
  - Keep distance from high profile vehicles such as tall trucks and busses

After

- Stay clear of downed power lines; report to the police

Heavy Rain

Heavy Rain

Description:

Precipitation that falls to Earth in drops more than 0.5 mm in diameter

Impacts:

- Flooding
- Reduced visibility
- Hydroplaning

Measuring Heavy Rain

- A rain gauge is ideal!
- Measure to the nearest hundredth of an inch
- Indicate the duration of time the rain was falling: 15 min? An hour?

Actions to Take: Heavy Rain

- Stay out of areas subject to flooding. Dips, low spots, small creeks, canyons, washes, etc., can become filled with water.
  - Do not play in or around culverts or drainage ditches as swiftly moving water that occurs during heavy rain can sweep you away.

Use the two-second rule to maintain a safe distance from the car in front of you and allow an extra two seconds in heavy rain.

If water is over the road,

TURN AROUND
DON'T DROWN

Flooding and River Ice

Break up along Kuskokwim at Birch Crossing, May 3, 2018

Flooding and River Ice

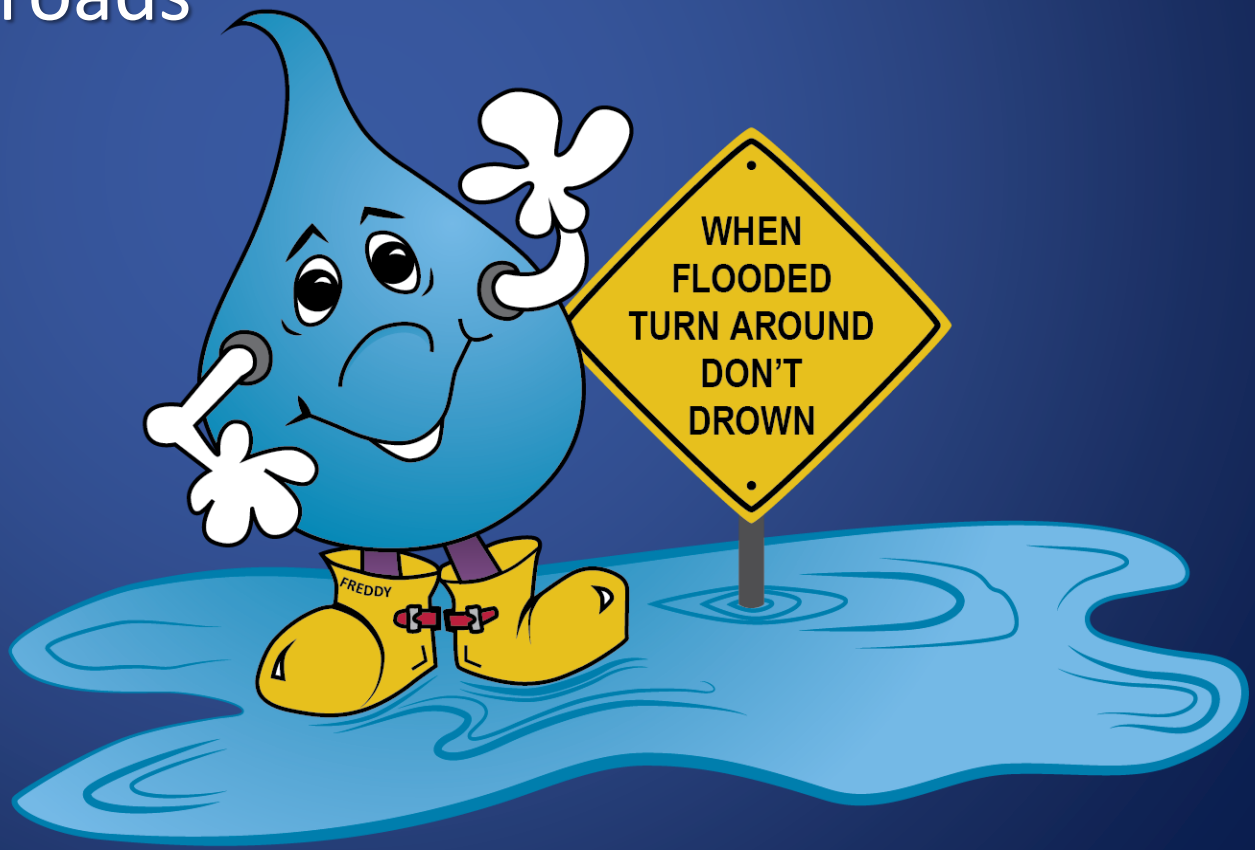
Flooding in Galena, Alaska

DEFINITION:

A flood is an overflow of water onto normally dry land. The inundation of a normally dry area is caused by rising water in an existing waterway, such as a river, stream, or drainage ditch.

Flooding Impacts

- Property damage
- Inundation of nearby buildings
- Washed out roads
- Evacuations
- Mudslides
- Landslides

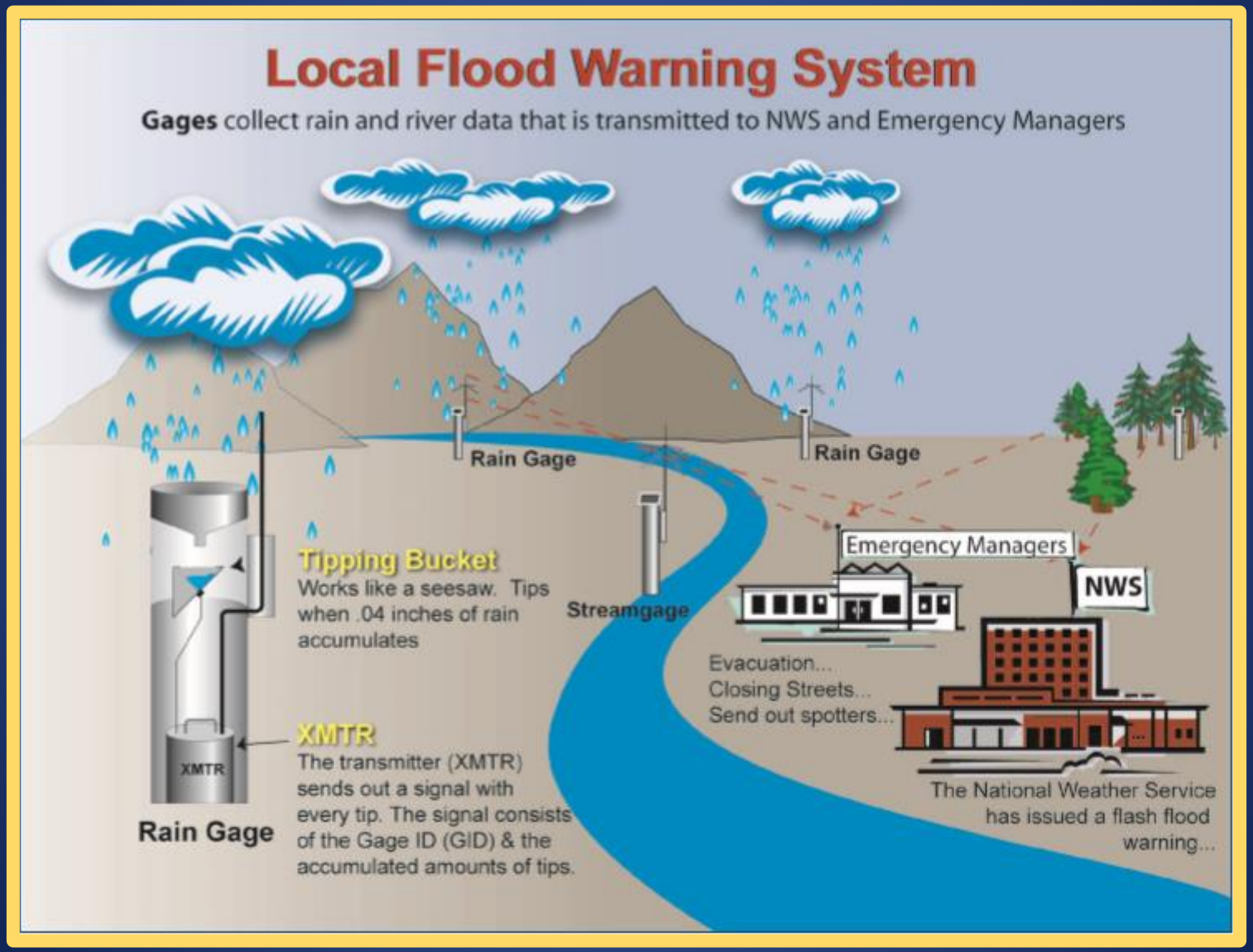


Types of Flooding

- River Floods
- Heavy Rainfall
- Ice Jam Flooding
- Snowmelt Flooding
- Glacier Dammed Lakes
- Flash Flooding

Mendenhall River flood in 2012. Photo by Heather Bryant/KTOO

River Floods & Heavy Rainfall



Ice Jam Flooding

- Floods can happen any time of year in Alaska
- Most often occurs in spring during breakup season

Eagle, Alaska. May 17, 2013
Courtesy Ed Christensen

Snowmelt Flooding

Snowmelt flood in Fairbanks in April, 2009

Glacier Dammed Lakes

- Also known as a Jökulhlaup (“Yo-kel-yawp”)
- Glaciers often have lakes between the ice and valley walls, or beneath of inside the glacier. This water builds up with rainwater and meltwater during the spring and summer
- A flood from a glacier dammed lake will often take 2-4 days to complete the process from the initial rise to receding below flood stage
- Occurs at a semi-regular interval; different for each glacier (every 2-3 years)

Glacier Dammed Lakes

Bear Glacier, Kenai Fjords National Park
Timelapse - 2017

Glacier Dammed Lakes

July 2011:

September 2006:

Flooded Mendenhall Campground in Juneau

Water.weather.gov
Weather.gov/Juneau

Flash Flooding Definition

Flash flood:

A flood usually caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours.

- Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons.
- They can occur within minutes or a few hours of excessive rainfall.
- They can also occur even if no rain has fallen, for instance after a dam has failed, or after a sudden release of water by a debris or ice jam.

Flash Flooding

Flash flooding in Anchorage as a result of heavy rainfall in 2015.
Courtesy of ADN

Thunderstorms, Lightning, Funnel Clouds, and Hail

Thunderstorm near Kwethluk, Alaska. Photo by Tyler Konig

Severe Thunderstorms

Although rare, severe thunderstorms do occur in Alaska

Cold air funnels, excessive lightning, tornadoes, hail, and gusty winds are all possible

NWS Severe Thunderstorm Criteria

A severe thunderstorm is a thunderstorm that produces at least one of the following:

- Hail at least 1” in diameter
- Wind gusts of at least 58 mph
- A tornado

* Note that lightning is **NOT** a criterion for a severe thunderstorm. While lightning can be deadly and safety precautions should be taken when lightning is in the area, lightning does not need to be reported to the NWS.

Thunderstorm Impacts

- Lightning strikes
- Gusty, damaging winds
- Heavy rain
- Hail
- Tornadoes

Severe Weather

Lightning strikes the hills northwest of the Yukon River.
Photo by Ned Rozell

Thunderstorms in Alaska

- Can happen anywhere, but interior and southwest Alaska are particularly susceptible.
- The boundaries of mountains, cold/warm air at the edge of the tundra, and the interaction with sea breezes all contribute to thunderstorms in Alaska.

Thunderstorm in Bethel, Alaska. Photo by Kayla Rousey

Measuring Hail Size

HAIL

Report the largest size stone you see

Compare to common objects

Dime/Penny	0.75 inches
Nickel	0.88 inches
Quarter	1.00 inches
Half Dollar	1.25 inches
Ping Pong Ball	1.50 inches
Golf Ball	1.75 inches
Hen Egg	2.00 inches
Tennis Ball	2.50 inches
Baseball	2.75 inches
Tea Cup	3.00 inches
Grapefruit	4.00 inches
Softball	4.50 inches

Funnel Clouds

- A rotating, funnel-shaped cloud extending downward from a thunderstorm base and exhibits rapid rotation
- Does **NOT** reach the ground

Funnel cloud on the Kenai Peninsula in July, 2005
Photo courtesy of Julia Ruthford, NWS Anchorage

Funnel Clouds

Tornadoes

- **Definition**: A violently rotating column of air extending from cloud base to ground
- Exhibit rapid rotation

Weak tornado lifting in Sand Point, Alaska

Scud Clouds

Scud clouds are small, ragged, low cloud fragments that are unattached to a larger cumulonimbus (thunderstorm) cloud base.

Scud clouds can easily be mistaken for tornadoes. Be sure to take a good look at the cloud structure before calling in a report.

Photo courtesy of NSSL Photo library

Rain Shafts

A Rain Shaft is a streak of precipitation falling from a cloud and reaching the ground.

Rain shafts can be very deceiving and can sometimes look like tornadoes. Rain shafts will usually change opaqueness as the precipitation increases or decreases.

Rain Shaft

Rain Shaft over Anchorage in 2014

Actions to Take: Thunderstorms

- Move indoors and stay away from windows
- If caught outside, seek out a low-lying area far away from tall objects (trees, poles, hills)
- If caught in open water, get to land and seek shelter immediately

Other Weather Events to Report

- Blowing snow
- Any flooding or flash floods
- Fog has reduced visibility to ½ mile or less
- Smoke
- Gustnadoes
- Waterspouts

Smoke

A smokestack or fire can produce a plume of smoke that sometimes resembles a tornado, especially from a distance. Unlike a tornado, the smoke will not be rotating.

Gustnadoes

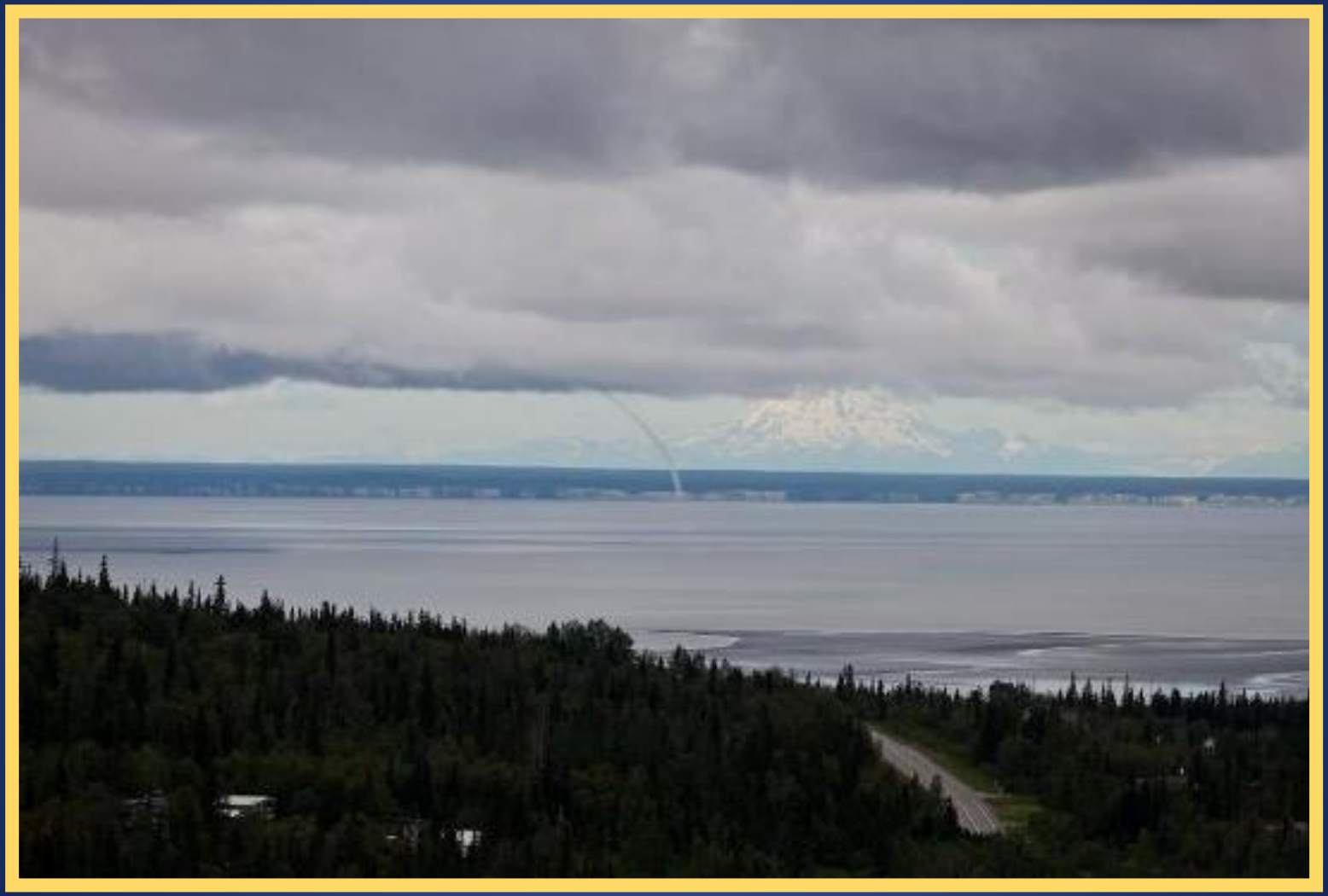
DEFINITION:

Small, short-lived vortices that do not extend directly down from storm cloud like a tornado does.

They made only extend from 30 to 300 feet above the ground with no apparent connection to the clouds overhead.

Photo Courtesy of Curtis Walker

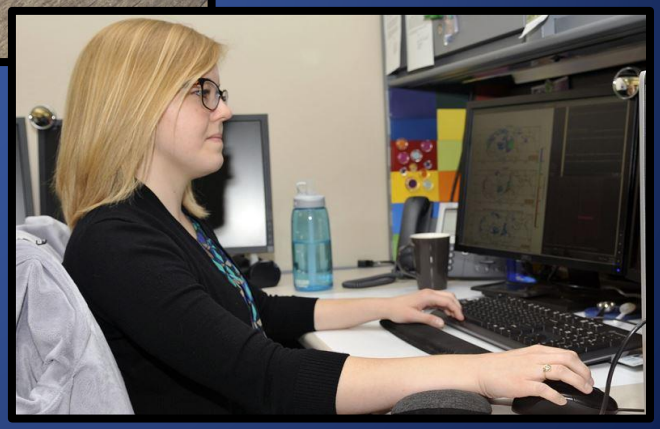
Waterspouts



Waterspout over the Turnagain Arm, July 20, 2014

Courtesy of Derek Reynolds

How to Report



What's in a Spotter Report?

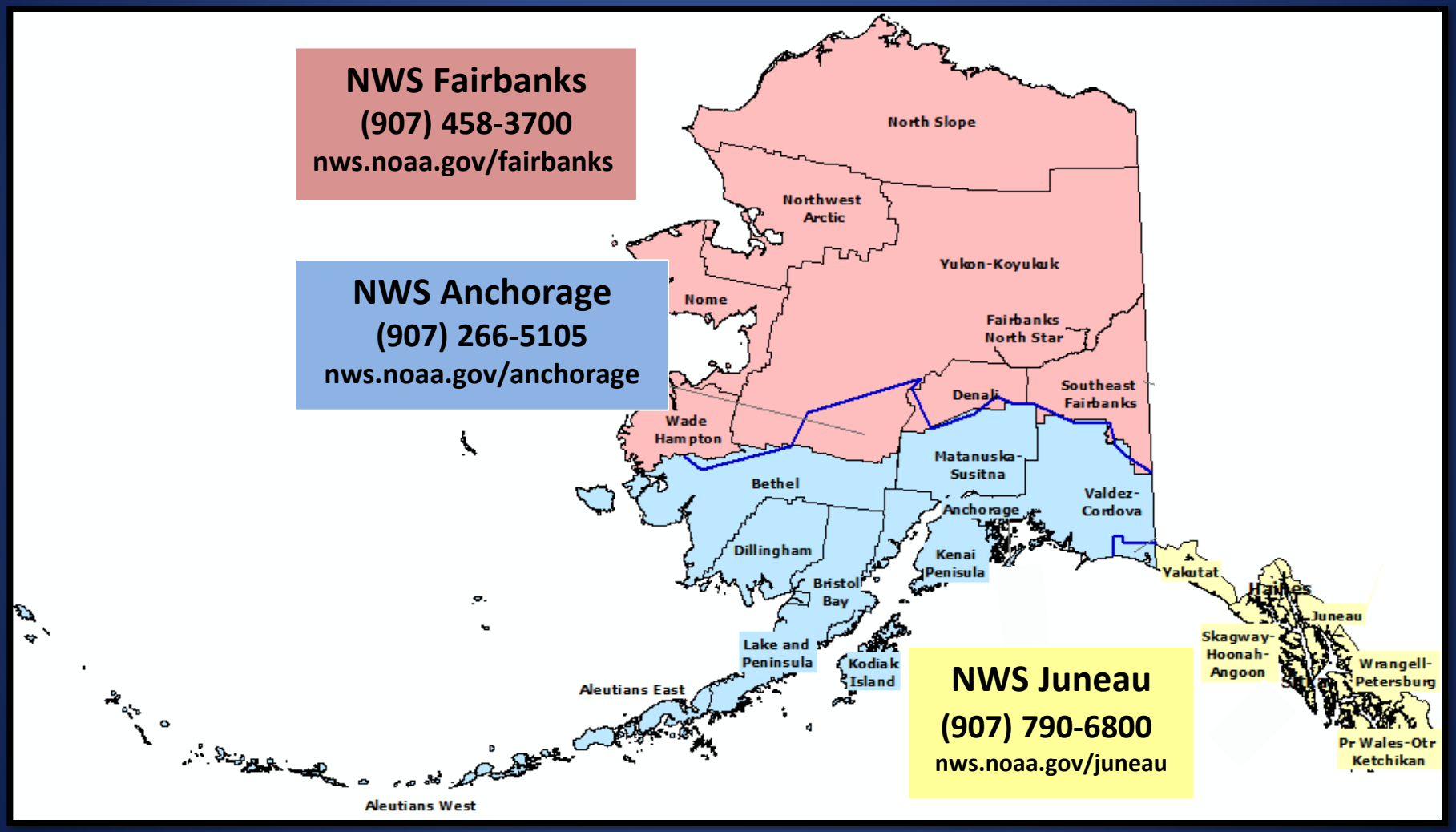
WHO you are

WHAT you observed

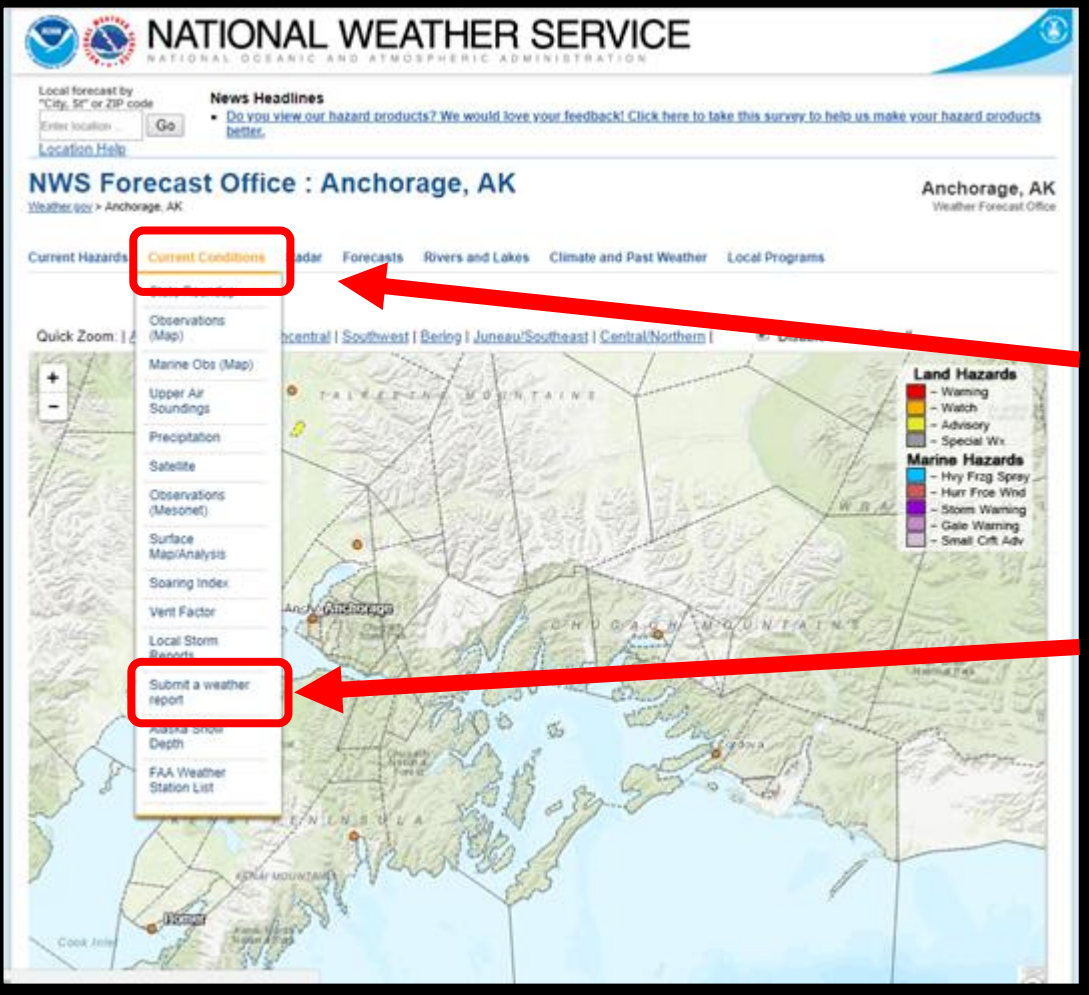
WHEN the event occurred

WHERE the event occurred

Find Your Local Office



Submitting a Report Online



Navigate to
weather.gov/anchorage

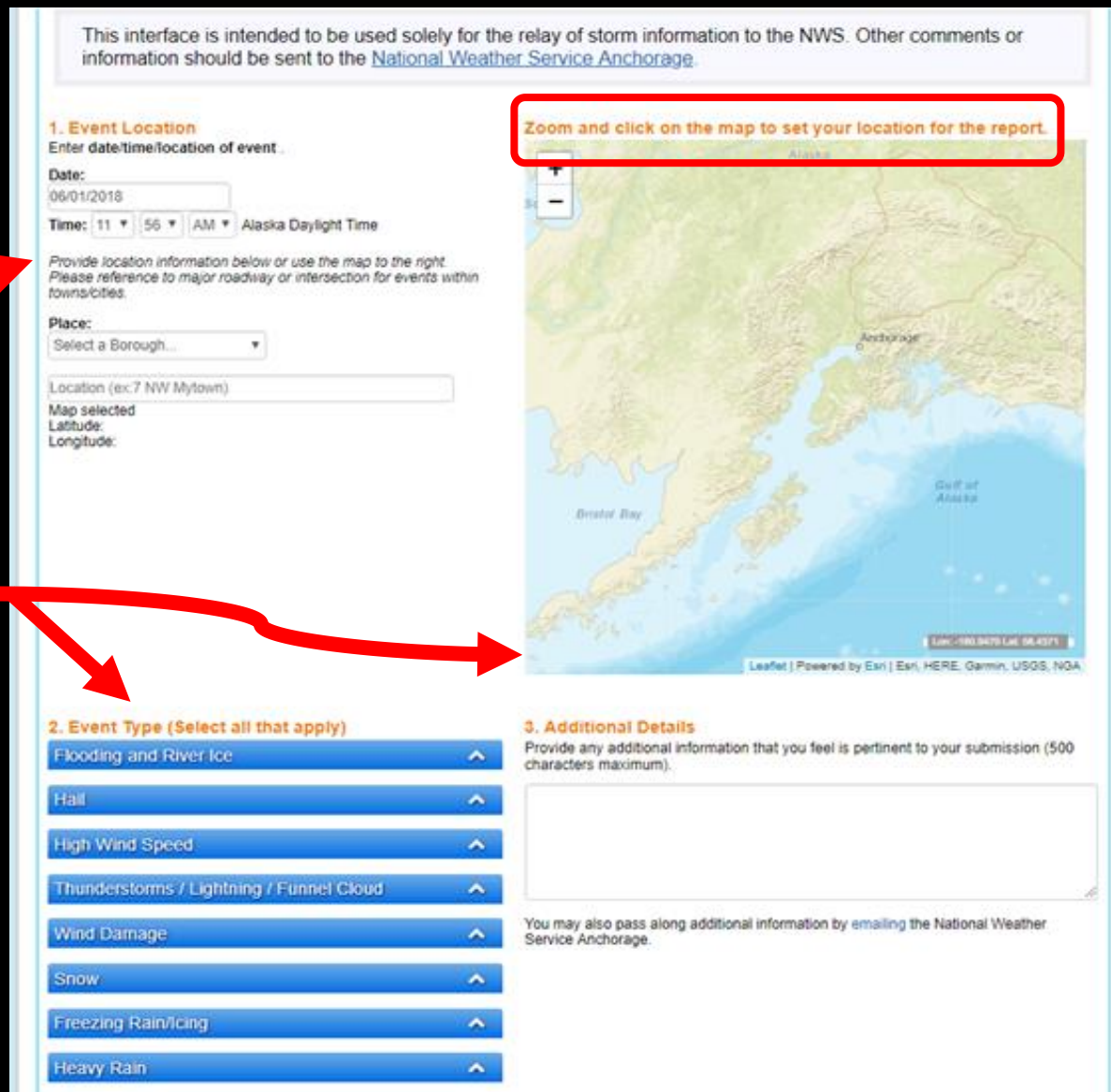
Hover over the top
“Current Conditions” tab

Navigate down to
“Submit a Weather Report”

Submitting a Report Online

Click on the interactive map to determine your location or type in your location

Select the event type and add any additional details



When to Report

WEATHER WARNING

A severe weather event is occurring or imminent in the next 36 hours in the warned area.

Action should be taken immediately to protect lives and/or property.

Forecaster is 80% or more confident. (Example: Winds 60 mph or greater)

WEATHER ADVISORY

A hazardous weather event is occurring or imminent in the next 36 hours.

Forecaster is 80% or more confident. (Example: Winds 45-72 mph)

WEATHER WATCH

Conditions are favorable for a significant weather event to develop in the defined watch area, generally in 36-72 hours.

Forecaster is 60% or more confident, and wants to give everyone an early heads-up.

Reports are always helpful!

A great time to report is when there is a Warning, Advisory, or Watch in effect near you!

Submitting a Report

You can ***always*** call our office at ***any time*** (24/7) to submit a weather report.

Anchorage Forecast Office:

907-266-5105

Got pictures? Email us!

anchorage.weather@noaa.gov

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Thank you!!

Photo Courtesy of NASA/Warren Gammel