Weather 101 for Birders

The following material appeared originally as three separate articles in the Howard County Bird Club's newsletter The Goldfinch: 54(3):6, 54(4):7-8, and 54(5):7-9.

Have you sometimes wondered why certain birders seem to turn up unusual species consistently? What do they know or what special techniques are they using that give them an edge? Of course there is always an element of chance, but, as Bonnie Ott frequently quotes, "Chance favors the prepared mind."

The prepared mind of the most consistently successful birders contains knowledge acquired through years of study and extensive time in the field. Such individuals recognize most locally occurring bird species and their songs, as well as specialized habitats and distinctive behavior. These birders also are likely to utilize another, often under-appreciated, factor: *knowledge of local weather*.

In a series of upcoming *Goldfinch* articles, the Howard County Bird Club Records Committee and the county's eBird reviewer will address some weather basics and how they can impact the presence and movement of birds in an attempt to make your time in the field more efficient, productive, and enjoyable.

If most of your current birding is done in "bluebird weather," featuring fair skies, light breezes, and moderate temperatures, you may be missing many special species. Some of the most exciting bird discoveries are made during, or soon after, dramatic weather events.

Learning to anticipate what may show up based on weather forecasts combined with your own judgment is an acquired skill. Like birding itself, judging weather conditions is not always an exact science. In this part of the Mid-Atlantic, even professionals are challenged and make mistakes; however, an acquaintance with weather basics and how they can affect the local birdlife may mean the difference between deciding where to go on a given day, whether time in the field is likely to be productive, or if it would be better to stay home.

Two things about the weather are worth keeping in mind:

1. Even in a county as small as Howard, weather is not uniform. At any time, there can be substantial variations in temperature, winds, and precipitation in different parts of the county.

2. Topography and weather are linked; both natural and manmade aspects of the landscape are important. Water bodies have an impact, while the steepness and orientation of river valleys may significantly affect the birdlife in that location. Howard County is adjacent to the Coastal Plain to the east, while the rolling hills of the Piedmont become increasingly more pronounced as one moves west.

Although all aspects of the weather are interconnected, individual topics addressed in coming issues will be high and low pressure systems and fronts, summer/winter storm systems (clouds, winds, and precipitation), and resources.

"The Birding Year in Howard County" on the club's website was first published in *Birding Howard County, Maryland* in 1995. The first lines for the month of January are just as valid today as they were more than 30 years ago: "Begin the new year by becoming a weather watcher."

A prepared birder has a horizon extending well beyond this county's borders. Becoming a continental "weather watcher" is worth the time and effort required as it is likely to pay dividends in better birding.

The majority of this county's weather originates in the West, although the most dramatic storms come from the South or East (nor'easters). Tracking what's happening in the Midwest can provide a glimpse of what's in store in the coming days. Looking beyond the center of the continent to the West/Northwest, provides a longer, although somewhat less accurate, outlook.

Simplistically, most of our weather systems originate over the Pacific Ocean and move across the country as two types of large, roughly circular, areas: high pressure systems and low pressure systems. Either one may be hundreds of miles in diameter. A "high" is characterized by high or rising barometric pressure, fair skies, light winds, clockwise rotation (in the Northern Hemisphere), and generally stable conditions. A "low" is dominated by low or dropping air pressure, extensive cloud cover, high humidity, or precipitation often coupled with strong winds, counterclockwise rotation, and usually unstable conditions. The movement of these systems across the continent may vary in speed, size, number, and paths depending, to some extent, on the season averaging about a week to travel coast to coast.

Birders know that the most bird species are often found where two ecotones meet; similarly, it is at or near the junction of two weather systems that some of the most dynamic birding takes place. The leading edge of each system is called a "front." These

are unstable areas of varying width and may be either invisible or obvious. A rising wind with a change in its direction, if coupled with clearing skies and a drop in temperature, marks the passage of a front and the arrival of a high. The front of an approaching low will likely bring strong winds, overcast skies, and some sort of precipitation, sometimes in the form of damaging storms. This leading edge of a low may occasionally be seen as a defined line of clouds advancing over a period of minutes or hours.

Oftentimes, the leading or trailing edge of a high or a low can dramatically affect bird movements during migration periods. Because highs rotate in a clockwise direction, the trailing edge of a high in spring can bring with it a surge of northward migration as the birds leverage the winds moving from south to north along the trailing edge. Conversely in fall, a low with its counterclockwise movement can bring a surge of southward-moving birds along its trailing edge and prevailing winds from north to south. Similar but opposite movements occur on the leading edges of those fronts; they can be anticipated by birders depending on the respective season.

The path of weather systems is influenced by the jet stream which is an invisible band of high winds in the upper atmosphere flowing roughly west to east, most often associated with the northern part of the continent. It is especially dominant during the colder months when temperature contrasts are greatest. Like a river, it seldom moves in a straight line. A portion of the jet stream may dip southward periodically in winter bringing polar air into parts of the U.S. unprepared for extended cold periods. These dramatic winter temperature drops should be of interest to birders. If the Great Lakes freeze almost completely, flights of diving waterfowl are triggered; eventually, even Red-necked Grebes and laggard scoters may appear. The jet stream's retreat northward, expected in spring, is followed by rising temperatures.

As the days lengthen, the weather battles of late winter and early spring give way gradually to more consistent and much warmer temperatures dominated by stable, sometimes stagnant, highs. Eventually, as summer begins to wind down, intense lows from the South, (occasionally hurricane remnants), push northward. At the same time, the jet stream begins to drift southward. Summer's lingering warm/hot temperatures and humidity meeting this cooler, drier air may produce dramatic storms.

How do experienced birders utilize knowledge of these large systems? Following are some ways weather knowledge can be applied to local birding.

Couple your weather research with frequent reference to the *Howard County Annotated Records (*on the website under Birding). The bar graphs showing peak movements assist anticipation of species.

Spring is the most compressed season for bird movement as species are anxious to reach breeding grounds. When a rarity shows up, there is less likelihood of it lingering than in the fall.

Timing of movement is individual for each species; many tend to move with a particular temperature (isotherm). Decades ago, county farmers looked for Canada Geese to head north during the first week or 10 days of March. More recently, the last week of February is likely to see equally major movement.

Short-distance migrants such as American Robins and Eastern Bluebirds, which are not dependent on flying insects or recent insect hatches, usually appear long before the long-distance migrants.

Insectivorous birds are later to move north in spring and among the first to start south in fall. For birds dependent on flying insects, misjudging their northward timing in spring can have dire consequences. Waterfowl, on the other hand, may simply be grounded far short of their destination until ice thaws water on their breeding grounds.

In March and early April, watching the highs with southerly winds positioned south/east of Howard County and the lows to the north/west can provide keys to the timing of various waterfowl flights.

Paying attention to daytime weather is as important as knowing what's happening at night as not all species are nocturnal migrants. Cranes, gulls, terns, eagles, hawks, and swallows are all examples of daytime migrants. Nocturnal migrants also move around in daylight hours, so species present at any location may vary considerably in the course of a day. Some of this movement is weather-related; at other times, it may have to do with feeding, resting, or bathing.

"Bluebird weather" is enjoyable and can produce good birding; however, the more unpleasant the birding weather, the better the odds for turning up rarities or fallouts.

Don't chalk off a day based on the situation at dawn. Weather can change dramatically within hours as fronts may move through quickly.

Immatures of some southern waterbirds are known to wander long distances after fledging. Stable highs, beginning in mid to late May, may produce an occasional surprise like a kite, Limpkin, or Anhinga.

Autumn movement is more leisurely stretching over many months. Despite local heat waves in August, it pays to watch areas in Canada and the Upper Midwest for sharp drops in temperature in those locations; they often mark the beginning of the first

southward passerine movement. A cool front in August locally may not change temperatures dramatically, but it likely produces the first migratory warblers.

In mid to late August, fronts approaching from the West are a signal for local birders to head to Triadelphia Reservoir to catch the passage of various tern species flying ahead of the storms. Sometimes as little as a single day will offer the chance for an unusual tern.

Waterfowl are much slower to move than passerines, although there are always a few exceptions. A low that causes sudden icing of potholes and small lakes in the Prairie Provinces and Upper Midwest may trigger major migration, but often individuals simply move short distances to larger water bodies. It may take truly polar blasts of air in late fall or early winter for some to begin their journey.

If farm ponds and other shallow water habitats like Race Road Wetlands are frozen, check the reservoirs or Springdale Quarry where sometimes even puddle ducks are forced to concentrate.

Watch surrounding states and other parts of Maryland for the appearance of species seldom seen in this county. For example, when Sandhill Cranes appear within 50 to 100 miles, there is a reasonable chance that the species could appear here, perhaps in a local harvested cornfield or at one of the reservoirs.

Storms are accompanied by varied precipitation and can occur at any time of the year. Because rainstorms and snowstorms usually produce different birding conditions, each will be treated separately. There are transition periods both spring and fall that can produce combinations of rain, snow, sleet, or freezing rain. Whatever the precipitation, birders should always consider storms (or their aftermath) as opportunities.

Rain

Light showers may actually increase bird activity while steady downpours usually bring it to a halt (not to mention making it difficult to keep binoculars and scopes dry). Late afternoon showers in May have excellent potential. By the time a rainbow appears, passerine flocks may already be engaged in a burst of feeding activity before their evening flight. Occasionally, during migration periods in the late afternoon after a day of rain, it is possible to encounter feeding flocks of 10-15 (or more) warbler species.

Extended periods of rain in spring may prevent migrants from moving on; at the same time, other migrants may continue to move into the same area behind the front swelling the number of birds waiting for a change in the weather. Under such conditions, counts of a single species may increase substantially. After multiple rainy days, May 7-8, 2022, produced eight Rose-breasted Grosbeaks at one feeder and six at two others.

From October to April if it's too rainy to walk around outside, bird by car checking flooded fields for geese, ducks, and gulls.

During rainy migration periods, don't limit your search for shorebirds solely to mudflats. Check local sod farms and flooded fields for shallow puddles where a variety of species may collect.

Snow, Sleet, and Freezing Rain

Stormy conditions with major temperature changes in March/April may produce a few choice waterfowl sightings, as well as astonishingly large fallouts on Triadelphia Reservoir. Snowstorms in March can often produce an amazing fallout of some early migrants such as Fox Sparrows. Merely by driving rural roads, it is possible to encounter dozens of this species desperately trying to forage along the sides of roads, especially if plowing has exposed some dirt and grass.

Snowstorms are usually preceded by a substantial drop in barometric pressure. Feeder watchers use increased feeding activity as a warning of an on-coming storm.

Heavy snowfalls and extended ice storms can cover or encase food supplies forcing birds into unusual locations as they become increasingly desperate for food and water.

Generally, snowstorms do not cover all surfaces equally. Winds across open expanses create conditions attractive to field species such as Horned Larks, American Pipits, and Eastern Meadowlarks. If the windswept acres expose bare soil or scattered sparse vegetation, there are opportunities for rarities such as Lapland Longspur and Snow Bunting.

After a snowfall, when salt solutions are used to treat roads, watch for birds along the edges of melting snow. They may be utilizing the salt solution as well as picking up grit to aid their digestion. The exposed grassy edges can be a magnet for field species such as Horned Larks, Savannah Sparrows, and the aforementioned Fox Sparrows.

When precipitation falls as sleet or at temperatures in which cold rain freezes on contact, migrants may become disoriented by light-reflective surfaces that are mistaken for water. Loons and grebes, for example, can end up on the tops of flat-roofed buildings, in ice-glazed parking lots, or on ponds too small from which to take off. Such species may need to be rescued so they can be moved to large bodies of open water.

Winds/Hurricanes

Hurricanes are tropical cyclones (counterclockwise systems of rotating winds around a low barometric center). Some work their way north along the Atlantic Coast; others move inland from the Gulf of Mexico. The severity of hurricane-force winds have dropped dramatically by the time such systems reach Howard County, although we may still receive many inches of rain over a several day period. Because of the county's inland location, we are fortunate in never receiving the direct hit that coastal areas do; however, wind and rain are still capable of causing extensive damage. Trees and branches falling on powerlines and roadways, along with gale-force winds can make driving during any storm extremely risky. Wait for the calm after the storm before venturing out.

Hurricanes often pick up birds that take advantage of the relative calm near the center, sometimes moving individuals or small flocks hundreds of miles. When the storm is spent, winds drop and/or swing to a different compass point, leaving some birds many miles from their normal range. Generally, birders have only a small window in which to observe such storm-waifs before they reverse course. For example, on October 30, 2012, after Hurricane Sandy passed by, Howard County had records of some more "seafaring" species such as Brant and Black Scoter. A few days later, a White-winged Scoter was found.

Gulls may move many miles to avoid high coastal winds. These same winds may occasionally pick up or assist pelagic species in moving far inland, much to the delight of local birders.

Wind direction and intensity both matter. Few birds care to waste precious energy fighting headwinds. During spring and fall migration, adverse winds may cause large numbers of certain species to drop onto the nearest water or into a convenient woodlot waiting until the winds drop or change direction. Often this change in wind comes near dawn; at first light migrants are likely to move on. If, however, strong gusts continue for several days and the food supply is good, some of those drop-in migrants may remain a little longer.

While headwinds can stall migrants, tailwinds, which are light breezes in the direction of migration, may encourage movement. In spring, when birds are intent on reaching breeding locations, there may be days when southerly winds drop multiples of half a dozen first-of-the-year species; these choice days may also be ideal for major flights of swans, geese, and various raptors.

Raptors (especially buteos and vultures) are well-known for taking advantage of winds from particular directions, as well as using updrafts which are columns of sun-warmed air. Howard County has no major topographic features that consistently direct winds. Major river systems may be the most important local feature used by migrants.

In addition to watching the local weather, it also pays to follow migration at regional sites. Even if you have no plans to visit Cape May or a hawkwatch site in Pennsylvania or Virginia, the variation (and sometimes the similarity) in species and timing can be astonishing. The same is often true of locations within Maryland as varied in distance or topography as Turkey Point or Dan's Rock.

Although birders are used to rising early for maximum activity at dawn, there are exceptions worth noting. Birds that feed predominantly on flying insects or that use warmed air are not "early birds." Chances for flocks of swallows, terns, and gulls are much better from midmorning through midafternoon. Large flights of hawks are most likely in late morning into midafternoon. During Broad-winged Hawk autumn migration (especially in the second and third weeks of September), a "lift-off" of Broad-wings as the thermals begin rising around 9-10:00 a.m. can produce a staggering tally of several hundred birds that suddenly just appear above a forested area where they had roosted for the night. Early spring and midfall when night temperatures drop substantially, the key to finding passerines early in the day is to seek wood edges where the sun is warming the vegetation and insects are active.

Clouds/Fog

Skies may range from entirely cloudless to totally overcast. Clouds may occur from ground level (fog) to thousands of feet in the atmosphere. The types of clouds and the amount of sky coverage are essential aspects of current weather. Clouds appear in many shapes, sizes, and colors defining not only current conditions, but they may be helpful indicators of coming weather—from what will occur in the next few minutes to signals for the next few days.

Fog can be localized in river valleys, or it may extend over large areas. Often ephemeral, there is likely to be increased bird activity when the fog begins to lift as the sun warms the air.

Fog that occurs at night during migration may cause the same disorientation of migrants that icing does, dropping birds in unexpected places.

Fog is most prevalent in autumn and may hang over fields and pastures for several morning hours. Over water, it can reduce views dramatically and is likely to be present longer than over land. In September, rushing to a reservoir at dawn may produce relatively few identifiable birds.

Warm, calm, misty mornings that are neither exactly fog nor rain can be extremely productive, especially if they last for hours.

Drought

The absence of precipitation may be as important as too much. Extended periods without rain usually drop water levels in lakes, ponds, and reservoirs. In this county, those conditions occur most often midsummer to midfall. This drop in water levels can create a variety of situations attractive to various species of waterbirds. Herons and egrets, for instance, are quick to take advantage of these smaller, more shallow areas where fish and amphibians are concentrated.

For species that nest in and around emergent vegetation at pond edges, a midsummer drop in the water level may occur at a time that allows small young to move freely on mud or in very shallow water, enabling them to remain near the protective base of cattails, horsetails, and other wetland plants.

The rise and fall of water levels, altered mainly by intermittent storms or showers, produce the required mudflats most shorebirds need for food and rest. This variation in water levels has two benefits: by covering the mudflats regularly, seeds do not have a chance to sprout, keeping the ground muddy and increasing the value of the habitat for shorebirds; secondly, occasional showers keep at least portions of the area at a consistency that encourages the presence of a variety of macroinvertebrates appealing to multiple shorebird species.

Flying insects and the birds that eat them can be used as a rough barometer. On humid days or when there are numerous hatches of insects rising from the water's surface, swallows will be coursing over the area barely above the water's surface. On warm, sunny days, insects rise higher and the same species may be foraging hundreds of feet in the air.

Temperature

In early spring, leaf emergence varies within the county not only from south to north but also from east to west. It is also affected by factors such as how directly the sun reaches a site. A river valley's orientation or the direction a slope faces as well as its angle can produce an astonishing variation in leaf growth, along with the presence of associated insects. A south-facing slope at Savage Park in late April along the Little Patuxent River may well contain more migrants than a northeast-facing slope at Daniels on the Patapsco. Likewise, the position of a site like Mount Pleasant on an open, sunny ridge is likely to be more productive than a cool, shaded river valley just a few miles away, although the species would not be identical because of habitat differences.

Weather conditions and how they affect birds in any location can only be generalized, as each year and each season produces different combinations. Seemingly identical weather may not be duplicated for decades. For a waterfowl fallout in this county, April 5, 1996, has few equals. After early morning rain, a cold front moved in with clearing skies and blustery winds. Two Horned Grebes appeared at Wilde Lake in the late a.m.; a mid-afternoon check of Centennial Lake netted 14 Horned Grebes, along with two Common Loons and two Red-necked Grebes, a new species for the park. Much more exciting were the birds at Triadelphia Reservoir. Two experienced birders spent the afternoon viewing the water from multiple locations. Their totals included 1 Wood Duck, 7 Northern Shovelers, 2 American Black Ducks, 150 Greater and Lesser Scaup, 5 White-winged Scoters, 5 Long-tailed Ducks, 15 Buffleheads, 17 Common Mergansers, 12 Red-breasted Mergansers, 30 Ruddy Ducks, 1 Pied-billed Grebe, 225 Horned Grebes, 1 Red-necked Grebe, 30 Common Loons, 31 Double-crested Cormorants, 1 Lesser Black-backed Gull, and 30 American Herring Gulls! Truly, a day to remember.

Although an identical situation has not occurred at that precise time again, March 13, 2026, was also a similarly memorable day. Not only does it demonstrate the role of weather during migration, but it also illustrates how small a window birders may have for observation. After five days of record-setting warmth, winter returned overnight with a dramatic drop in temperature. Much of March 13 was overcast with rain, sleet, and several inches of wet snow. Despite the unpleasant conditions, a few birders ventured out checking local lakes in hopes of a pleasant surprise. A stop at Brighton Dam at 10:45 a.m. netted a grand total of four Common Mergansers; central lakes in the late morning and early afternoon offered nothing unusual and a limited number of waterfowl species. By midafternoon, the precipitation was ending and the temperature began to rise slowly. Two birders checking Triadelphia Reservoir around 6:00 p.m. and another birder there at 7:00 p.m. found Gadwall, Green-winged Teal, Ring-necked Duck, flocks of both scaup, Hooded, Common, and Red-breasted Mergansers, Pied-billed and Horned Grebes, as many as four Red-necked Grebes, as well as an Osprey, Bald Eagles, and a Common Raven. The viewing was solely rom Brighton Dam as the reservoir was not yet open to the public on that date. There could have been many more birds out of sight on the main reservoir. By late in the day, the skies began to clear. At 8:00 a.m. the following morning, four birders again scanned from the dam. They netted 1 Mallard, 2 Canvasbacks, 2 Greater Scaup, 1 Lesser Scaup, 1 Pied-billed Grebe and 4 Bald Eagles. As is often typical, most of the waterfowl present the evening before had left overnight.

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Many experienced birders have become amateur meteorologists understanding how success in the field at any time of the year can be, and often is, related directly to weather conditions. Help chance favor you. Make this the year that you, too, become a weather watcher!

Weather References

Listed below are weather information sites that birders use.

RainCrow	National Weather Service	Accuweather
WeatherBug	Weather Underground	Windy

Howard County Records Committee: Joanne Solem, Joe Hanfman, Russ Ruffing; Howard County eBird reviewer: Tim Carney.