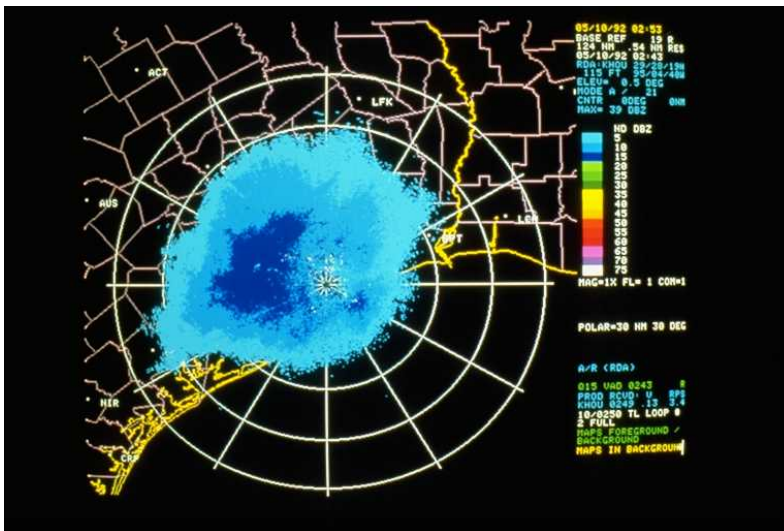


Tracking Spring Arrivals: Bird Migration as Observed by NEXRAD Radar

By John Arvin, Research Associate, Based in Brownsville, Texas

Date: March 19, 2011 11:32 AM CDT

For the past several years I have been posting analysis of spring migration on the northern and western Gulf coast as observed by NEXRAD weather surveillance radars. The radars form an interlocking chain around the periphery of the US Gulf coast and are streamed onto the Internet at a number of meteorological sites. Unfortunately the technology behind NEXRAD radar has not been shared with our Caribbean and Middle American neighbors. Nor is the range of existing NEXRAD sites much more than about 100 miles offshore, so we are blind to what is happening outside of a narrow zone along the coast. Nevertheless NEXRAD is very useful in observing (remotely) bird movements along the Gulf coast. If you want to know more about NEXRAD and how it works visit the Radar Ornithology site of Clemson University at www.clemson.edu/birdrad.



Winds aloft as measured by radiosonde ("weather balloon") early this morning across the Gulf coast reporting stations varied from 22 kts.SSE at Brownsville to 10 kts. SE at Lake Charles and New Orleans (Slidell). Radiosonde are released twice a day - at 7 a.m.(00:00 UTC) and 5:00 p.m. (12:00 UTC). In order to determine whether it is birds that are being observed one has to know the prevailing upper level winds. "Upper level" considered to be that wind speed at an altitude equal to 850 mb., which takes in the great majority of the level at which birds fly in migration. Winds at that altitude may be very different in strength and direction than winds at ground level.

At noon on Saturday there are a few very scattered returns moving above posted wind speeds approaching Brownsville from the south. These likely represent shorebirds, terns, and waders.

Date: March 20, 2011 11:18 AM CDT

Upper level winds were uniformly above 20 kts this morning (26 kts at Brownsville to 22 kts. at New Orleans) and strong gusty surface winds made finding the few migrant land birds difficult. In late morning all targets were moving near posted wind speeds. This indicates that little or no bird migration is occurring at the present. I will update later in the day if conditions change. Locally here at Brownsville I checked a shorebird area that has had tens of thousands of birds (mostly Dunlin, Black-bellied Plover, Willet, and Western Sandpiper) up until a couple of days

ago to find it birdless yesterday afternoon. There were no obvious arrivals except several flocks of Snowy Egrets making their way up the coast. Spring Break has kept the beaches off limits for the most part to both birds and birders but it peaked yesterday and coastal birding should improve markedly during the coming week.

Date: March 22, 2011 3:01 PM CDT

Today's upper winds are above 30 kts. due S at Brownsville to SSW at New Orleans. The radial velocity images from all the northwestern Gulf stations are not showing targets moving faster than posted wind speeds. Given the date and conditions (which are excellent for migrating birds) the apparent lack of migrating birds on radar makes no sense to me. I can only conclude that the wind speeds which were determined about 7 a.m. by radiosonde are presently reduced. Surface winds here at Brownsville are certainly not reduced gusting in excess of 30 kts. and birding conditions are poor.

Reported arrivals across the region show breeding nearctic-neotropical migrants are arriving at inland reporting locations in some numbers. These same migrant species are either going unreported along the coast or are represented by single individuals at coastal stop-over sites. The latter are probably individuals that are not as energetically fit as are the average members of their species. I keep loose track of arrivals as reported on the two listservers and it seems to me that a number of species are being reported well later in the season than average. Swallow-tailed Kite is one of these.

Date: March 23, 2011 10:50 AM CDT

Today has the first really interesting displays of this season so far. For one thing it is a relief to have the returns displayed in precipitation mode for the first time this season. Precipitation mode filters out a lot of the extraneous reflectance from pollen, aerial plankton, and dust or haze leaving the stronger returns given by precipitation and (unintentionally for the weather folks) birds. The upper level winds as measured by radiosonde range from 32 kts. due S at Brownsville to 25 kts. at New Orleans. Both Lake Charles and NO have a strong westerly component to the upper winds. Houston, which either does not release radiosonde or at least doesn't post it to the internet (John Tharp - how about that?; John is a birding meteorologist stationed at Houston and has helped me to understand some weather phenomena) is showing arriving targets on its western quadrant so probably the winds there are southwesterly as well. The wind data from Corpus Christi are garbled and unusable today for some reason.

Brownsville is showing strong returns moving 15 kts. over observed wind speeds which is a sure sign that birds are producing these returns. Additionally the base reflectance image is beginning to take on the classic doughnut shaped signature produced by birds overflying the station and continuing northward. The activity is centered in the 4000 ft. layer of the atmosphere. It appears that there is a slight tendency for the returns to be skewed to the northeast at Corpus. In other words the reflective bodies are beginning to steer to follow the coastline which curves to the northeast is the Corpus area - hence the "Coastal Bend". Houston, Lake Charles, and New Orleans are not showing obvious bird activity (yet) and the "signature" of the returns has the stringy appearance associated with insects. It will be interesting to check later in the day to see if

the returns visible at Brownsville and Corpus Christi spread northeastward to the more eastern stations.

Date: March 24, 2011, 3:54 PM CDT

The upper winds are well down today due to the presence of a "cold" front which is dissipating along a Houston - New Orleans line. Speeds well below those seen recently, 12 SE at Brownsville and Corpus Christi and single digits at Lake Charles and New Orleans, but from the W and WNS respectively. There is no visible activity from Houston eastward to New Orleans. Migrants in small numbers were arriving at Brownsville from the SE.

The Corpus radar is showing returns that appear to be hawk kettles in eastern Brooks County angling into the SW corner of Kleburg Co. at 3 p.m.

This activity is strung out along a 40 mile long area angling SW to NE and will be approaching Kingsville within the hour. I expect that there will be an increase of neotropical migrant activity at coastal stop-over sites along the upper Texas and the SW (and maybe SE) Louisiana coasts. Don't expect any blockbuster fallouts but a sprinkling of birds that no doubt will contain the expected Orchard Orioles, Scarlet Tanagers, and Rose-breasted Grosbeaks plus better numbers of the early warblers, most of which have already been reported as single birds here and there. Even when head winds are not a factor, just the loss of tail winds is enough for a few of the less fit individuals to find it prudent to put down as soon as possible on a trans-Gulf flight.

Date: March 25, 2011, 2:30 PM CDT

After a bit of a change yesterday for areas north of Corpus Christi eastward things were back to "normal" today (warm to hot and breezy to windy from the SW. The winds aloft ranged above 20 kts. SW (higher at Brownsville) and incoming bird reflectance from the SE was very unimpressive at Brownsville and Corpus, nonexistent at Houston and Lake Charles and a bit heavier than elsewhere in the SW quadrant from New Orleans. Raptor (or raptor-like reflectance from large bodied birds that migrate in the same fashion such as Anhinga, American White Pelican, etc.) returns were visible over the inland half of Kenedy Co. with one kettle in SW Brooks Co. Again these raptor-like returns were moving into southern Kleberg Co. The northern half of the NEXRAD covered area is due for another front that dissipates just along the northern Gulf coast but leaves Corpus and Brownsville in the hot and windy zone tomorrow. Hopefully its effects will be strong enough to influence bird migration for the weekend.

Date: March 26, 2011, 4:38 PM CDT

Today's activity is hard to read. Upper winds measure just below 30 kts. SW across the board except at Corpus which is showing half that speed. When one reading is so far out of line with those stations on either side of it I begin to wonder how accurate the outlier is. At any rate, there seem to be little or no reflectance moving at speeds significantly faster than posted winds, so little migration would seem to be occurring. I emphasize "seems" because given the date and the prevailing conditions I would expect there to be some significant movements. It appears that there is some "raptor-type" reflectance just south and just north of Corpus, which would not

surprise me. With the medium strong SW component to the upper winds I would expect that today's flight, if indeed there is one, would show a western species component - say Clay-colored, Lark, and other sparrows, perhaps an early Western Kingbird or two. At any rate we will know later this evening or in the morning when observers share the fruits of their efforts with those of us who are cooped up indoors.

Something is going on here at Brownsville. The strong, gusty surface winds that dominated the morning and early afternoon have slacked and it has become overcast. Perhaps this precedes the "dry line" forecast to bring hot, dry air off the deserts of the central plateau of Mexico, something that happens once or twice a year in this part of the world.

Date: March 27, 2011, 1:48 PM CDT

A front which is presently dissipating on a line from San Antonio eastward through Houston has produced a split ticket as far as upper winds and general weather is concerned. In the western Gulf winds are very light and S and SE at Brownsville and Corpus respectively. Jumping over the void in reported upper air conditions to Lake Charles and New Orleans there are SW and W winds in the 24 kt. range. Very small numbers of migrating birds (at Brownsville) and larger numbers Corpus and Houston show clearly with flight speeds well above wind speeds. There are arriving birds in SW Louisiana also but nothing much is going on at New Orleans presently. Surface winds in the south Texas area are very light and that, plus the overcast, make being in the field most pleasant.

I checked the stop-over sites on South Padre Island very thoroughly this morning and came up completely empty handed. Newly arrived Sandwich Terns (80+) all were showing a slight pink blush while a single Franklin's Gull was truly hot pink. In my neighborhood in Brownsville I drove through a mixed flock of swallows and Chimney Swifts in a place I could not stop.

Date: March 29, 2011, 4:03 PM CDT

At 5:00 a.m. migrants were visible on NEXRAD displays at Brownsville (I didn't check other stations) and I could hear Indigo Buntings overhead. I failed to find evidence of a flight in the field later in the morning, however. This afternoon all NEXRAD stations except Corpus were in precipitation mode. Brownsville and Corpus (with upper winds S at 25) appeared to have scattered to numerous returns that appeared to be in the signature pattern of migrating raptors. However these targets were not moving at a greater velocity than observed wind speeds. I used the handy filter function of Weathertap.com's radar lab to view radial velocity images with all velocities below the wind's velocity of 25 kts. removed and got a blank screen each time. No reporting station seemed to show migrating birds. This puzzles me, given the date and conditions.

A front is forecast to move through the area tonight. By arriving at night the front will lack daytime heating to help increase the probability of precipitation but perhaps a wind direction change will be sufficient to put a few migrants down at coastal stop-over sites.

Date: March 30, 2011, 3:21 PM CDT

Perhaps the subject line should read "bird migration as NOT observed via NEXRAD" as that has been the case today (see related post on Texbirds). Winds are north at all reporting stations (Corpus was down) except New Orleans where they are W. The radar displays are quite unimpressive. However, I have just returned from the field and a pretty darn good display of early season migrants have been steadily building all day on South Padre Island. Origin of the observed species is interesting to speculate. All the species we saw represented have populations which winter in Mexico north of the Isthmus of Tehuantepec (as well as more widely in the neotropics or are birds that migrate over land (e.g. Franklin's Gull) and the birds observed may represent over-land instead of over-water migrants despite being put down by adverse weather in a coastal location. Moderate N winds may have forced migrating birds to fly on the deck to take advantage of the slight reduction in headwind speed due to friction with land or water and thus to be invisible to radar energy which is angled above the horizon. Alternatively the accumulated mass of birds may simply be too thin to be picked up by NEXRAD despite being fairly impressive to migrant-starved observers. Tomorrow should be pretty good also, but most birds will depart as soon as upper winds shift to the S which should happen later in the day so this will be a short-lived phenomenon.

Date: March 31, 2011, 4:32 PM CDT

Bird movement appears to be coastwise between Brownsville and Lake Charles, and it appears to be winding down from a peak earlier in the day. There is no obvious activity at New Orleans. The middle Texas coast (Aransas and San Antonio Bays) is picking up birds that were flying just off the coast. They are continuing straight northward moving inland in the area referred to. From there all movement is NE and on-shore. There are no returns from over the Gulf approaching the upper Texas or SW Louisiana coasts. In between fronts the heavy wader/shorebird traffic will have to suffice. Most of the waterfowl have departed Texas at least.

Date: April 1, 2011, 12:55 PM CDT

The upper air information is collected at 07:00 CDT but it was late morning before it was posted to the internet (irritating; it would be great if there were real-time upper wind data available but there's not). At any rate, the region was cleanly split - light SE winds at the two Texas stations and moderately strong NW winds at Lake Charles and New Orleans.

The Texas stations are showing targets moving well above posted wind speeds moving straight north along the N - S oriented coast and NE at Houston. There are targets with the signature of raptor migration (or other large-bodied birds which use the same migration strategy but the odds highly favor raptors) in the NW corner of Kenedy Co. moving into southern Kleberg Co. The two eastern stations are not showing bird movements at this time, but the brisk NW winds aloft may be keeping birds too low to be visible to NEXRAD.

As the high pressure center moves E and out of the region we will return to a moderate to strong onshore wind flow which greatly aids trans-Gulf migration. We are entering the period in which trans-Gulf migration is the dominant feature in the region. The next migration-stopping weather

system is due to pass through the region next Tuesday. It is forecast to be a vigorous system but until then we will be stuck with a few trans-Gulf migrants that are stressed by a Gulf crossing plus the heavy circum-Gulf migration that shunts birds well inland before they land. Trans-Gulf migrants may still be arriving on the Louisiana coast and birds that are already on the ground in coastal stop-over sites will stick around until the wind shifts into a more favorable quadrant.

Date: April 2, 2011, 10:21 AM CDT

Since the upper air soundings were posted a little earlier than normal I decided to take a look at them over an expanded regional view of winds at the 850 mb level (more or less 5000 ft.) which takes in most of the altitudes that migrants use. First of all, migrants depart areas south of the Gulf from a broad front in the 10 degree N latitude vicinity (not just the Yucatan Peninsula) so I checked reporting stations in southern Veracruz, Merida, Yucatan, Belize City, and San Andres, an island in the Caribbean that politically belongs to Colombia but is located NE of Nicaragua. The wind speeds in the neotropical region were uniformly low (strongest ESE at 16 kts. at San Andres), lowest 4 kts. SE at Merida) and generally from directions that would probably not deter departing migrants, but that would not provide a huge boost in air speeds. Unfortunately only Belize has a radar available on the internet that might display a departure if the flight was heavy enough. Obviously that radar site would need to be consulted at dusk.

Of the 5 NEXRAD stations consulted only Brownsville and Corpus Christi were showing birds migrating and these were moving against the wind (albeit a light headwind), a sure sign of powered flight. The Brownsville movement was low altitude. Both stations were reporting very light flights. Day time heating had not yet become a factor so there are no raptor migration returns (yet; raptors require rising air currents provided by warmed earth warming the air layer above it to provide lift). Houston, Lake Charles, and New Orleans were showing no activity at 09:00.

Date: April 3, 2011, 4:43 PM CDT

The upper winds are remarkably uniform today - 21 kts. WSW at all TX and LA stations. And today is the first day this season where there has been an obvious trans-Gulf component (as opposed to a coastwise movement up the lower Texas coast and turning northeast with the coastline). That there have been trans-Gulf migrants is obvious because species which are known to be trans-Gulf migrants have been reported for the last couple of weeks arriving at inland locations in both Louisiana and Texas, but the traffic has been too light to be picked up by radar. Specifically birds are visible over the northern Gulf from SW of Houston to the Houma/Grand Isle area SW of New Orleans. New Orleans itself is thus far beyond the flight. Lake Charles is the center of this movement. Given the ideal conditions for migration I expect 98% of the arriving migrants will continue well inland before landing this evening. A fairly strong cold front is forecast to sweep the coast from W to E tomorrow afternoon and night. This should result in an obvious spike in numbers of migrants at coastal stop-over sites on Tuesday.

Date: April 4, 2011, 12:00 PM CDT

12 noon: There is a complex and fast-moving weather situation which is having strong impacts on migrating birds today. A fast moving cold front with strong NW winds behind it is approaching the coast and is visible in the NW quadrant of all stations except Brownsville at noon (but will soon be pushing that far south). Ahead of the front the S and SW winds are literally roaring (51 kts. at Brownsville and 45 at Lake Charles). With tail winds in that category it is easy to see how birds can cross the Gulf in 10-12 hours and continue well inland before stopping. Houston, Lake Charles, and New Orleans are showing well defined trans-Gulf migration with the signature "doughnut" shaped returns, but migrants are being influenced by the approach of the front. It appears that the strength of the winds and their SW track has pushed a relatively heavy flight of migrants toward the NE portion of the region. There is not a lot of convection (thunderstorm development) associated with the front on its SW end. I anticipate a quick turn-around of winds beginning tomorrow morning, so if you can get to coastal stop-over sites late this afternoon and early in the morning is the time to be there.

Date: April 4, 2011, 12:52 PM CDT

Corpus is showing an area of raptor returns across NW Kenedy Co. and into central Kleberg Co. What is probably the left edge of the trans-Gulf flight is visible offshore to the east and is moving SW to NE. There is a flight of something (shorebirds, Franklin's Gulls would be a good guess) moving up the mainland coast of the Laguna Madre to Corpus Christi Bay where I lose it. There is also well defined movement up Padre Island (again, probably shore/beach birds). I expect there will be trans-Gulf migrants in the usual places later today and tomorrow morning but it looks like the main thrust of the trans-Gulf flight is toward the NE. South Texas will get the crumbs. Again, the whole scenario will be short-lived and then it will be back to a week of strong S winds.

Date: April 5, 2011, 3:38 PM CDT

The ferocious winds of yesterday evening (gusts to over 50kts locally) had died off to moderate with a northerly component at all stations. Since the movement of the pressure gradient continued through the day the actual upper air speeds dropped steadily, but to what levels we cannot say other than that they are below this morning's soundings. At any rate the only bird migration visible on NEXRAD this afternoon is some raptor movement (against the wind) SW of Brownsville in north central Tamaulipas and south of Corpus Christi. The front is visible in water vapor imagery and has crossed the western half of the Yucatan Peninsula by 15:00. This may prevent an exodus of migrants this evening from south of the Gulf. We won't know about that until tomorrow afternoon. At South Padre Island there were few or no new individual migrants than there were yesterday, at least up until midday. A few locations on the upper Texas coast reported a small fallout yesterday afternoon but I have no reports from there or from Louisiana for today.

Date: April 7, 2011, 3:01 PM CDT

There is a diffuse trans-Gulf migration arriving at Corpus (where very light), Houston, Lake Charles, and New Orleans. "Arriving" is probably not the right term. I expect all but the usual 1-3 % that drop in at the immediate coast are continuing well inland with the upper winds favorable

for continued migration. Brownsville has some coastwise movement, which includes some raptor migration NW of Brownsville in NE Hidalgo and W Willacy Counties. Traffic rates are light today but if the upper winds continue favorable (~20 kts. SE at Merida, Belize, and Veracruz) that should increase the traffic rates over the next few days. The problem is that I see no weather phenomena on the horizon to trigger a mass grounding in coastal stop-over sites. There should continue to be a trickle of migrants, but no really good numbers.

Date: April 8, 2011, 3:02 PM CDT

The birds are taking advantage of excellent winds for moving them NNE. There is a moderate flight of trans-Gulf migrants arriving on the upper Texas and SW Louisiana coast this afternoon. The flight is centered on Lake Charles and extends westward to take in Jefferson and extreme eastern Galveston Co. and eastward to the Houma vicinity. Given the wind conditions I expect the vast majority to continue well inland before landing. There is always that small fraction that need to land as soon as possible and these will be found (with some effort) in the coastal stop-over sites.

Along the western Gulf coast there is a sprinkling of trans-Gulf migrants well out to the limit of coverage. These appear to be the western edge of the flight discussed above. There is coast-wise migration straight up the lower Texas coast bending toward the NE where the coastline does. There are returns consistent with raptor migration SW through NE of Corpus Christi. The strongest returns are actually NE of Corpus. A substantial proportion of the visible migration is likely to be shorebirds.

Similar weather conditions are predicted through the weekend so if coastal birding is in your plans expected a sprinkling of trans-Gulf migrants at coastal stopovers, especially in the afternoons when birds will be newly arrived and in need of food and water.

Date: April 9, 2011, 3:16 PM CDT

There are trans-Gulf migrants overflying the Houston and Lake Charles sites this afternoon. A check of the Fort Polk site indicates that they are continuing inland. Sites on either side don't show much of a flight, but quite likely small numbers of migrants are moving there as well. Until we get a break in the weather pattern migrants will remain few in numbers but with ones and twos of a fair variety of species at coastal stop-over sites. There are raptor returns moving through Hidalgo County northward all the way to Corpus Christi where they are passing west of the city. There are trans-Gulf migrants arriving in small numbers in the Houma-Grand Isle sector.

Date: April 10, 2011, 2:51 PM CDT

Dust off yesterday's report (or for that matter, any day the past week) and you have today's. Light migration is being observed at all stations under strong S wind conditions. The situation becomes more interesting beginning tomorrow and extending through most of the week and into next weekend. Another one of those super hot, super dry "cold" fronts moves through the region from W to E beginning tomorrow morning. Blast furnace winds will be strong and offshore. Onshore fire danger will be extreme. Timing of frontal passage is important in the degree to which migrants are downed. Tuesday morning will be different, but to what degree is difficult to say. An almost identical scenario a week ago did not produce migrants in the expected numbers (in fact, barely at all). No prediction on this one.

Date: April 11, 2011, 1:01 PM CDT

At noon the front had cleared all the Texas stations and was verging on Lake Charles. The wind shift to a totally opposite direction and unknown speeds since the atmospheric soundings were conducted at 7:00 am it leaves one "flying blind" to a degree. However the pattern of the returns would seem to indicate that arriving trans-Gulf migrants were coming ashore at Lake Charles and New Orleans ahead (for a short time longer) of the front. Birds offshore from Brownsville were headed toward shore against a headwind. The front was clearing through the Corpus and Houston sites and producing some scattered and light showers at the latter location. Birds are not visible in those displays but may be obscured by weather returns. The timing of this front, unlike the last, is early enough in the day to intercept incoming migrants over Gulf waters. I think that there will likely be considerably more birds at coastal stop-over sites than with the last system.

Date: April 12, 2011, 3:04 PM CDT

If NEXRAD can be believed (and I don't think it can) there is absolutely nothing happening at any of the western Gulf stations. It is a pleasant day for a change with light NE winds aloft. I think that trans-Gulf migrants are probably incoming at very low altitudes to take advantage of the slightly lighter winds due to friction with water and land. That is one situation where only footwork can bring back the information. So check your emails for reports from the field. Technology is trumped by birdercraft once again.

Date: April 13, 2011, 8:32 PM CDT

I was able to very quickly check the NEXRAD imagery around noon (nothing apparently happening) and again just now. Additionally I was in the field for 2.5 hours at Sabine Woods on the upper Texas coast (about 20 miles west of Peveto Beach). Winds were recorded as light this morning (1 kt. at New Orleans; it doesn't get much lighter than that) and were NE through SE. I witnessed a classic "drop in", a good-weather, late afternoon arrival of small numbers (nice variety) of trans-Gulf migrants which began with a gorgeous and slightly early Bay-breasted Warbler (see related post to Texbirds). These drop-ins occur most days unless the south winds are really strong. Today's began about 5:00 pm.

Date: April 14, 2011, 2:00 PM CDT

Trans-Gulf flights are arriving at all stations although the strongest returns seem to be from the southwestern stations. The flight may well be building northeastward as the day wears on. Houston westward all are showing the distinctive doughnut-shaped signature of birds overflying the radar station. Yes, this means that most birds are not landing. They have a lot more of a tailwind today so I expect the majority to continue well inland. Probably there will be a late afternoon "drop in" but it may not be as strong as the last couple of days. Time will tell on that and it will be interesting to see how it works out.

The weekend forecast (weather, that is) is for a real honest to goodness cold front (dry type) to push through tomorrow night and Saturday. Though dry fronts are never as effective as stormy ones in downing migrants I expect that there will be a significant fallout Sunday just because we are entering the period of peak traffic. It will be nice timing for the working stiffs, but a day late for the Great Texas Birding Classic teams.

Date: April 15, 2011, 1:55 PM CDT

The actual front is preceded by several hours of southwesterly winds. It cleared the Texas coast about 12:00 and lies between Orange and Lake Charles presently. No migrants had dropped in to stopover sites along the Texas/Louisiana border as of noon, and none are visible behind the front. Nevertheless I think that birds will be forced down by headwinds this evening and tonight. Tomorrow should be fair to fairly good at coastal stopovers. Late tomorrow afternoon could be good to very good, depending on winds. This front is pretty strong for this late in the season, but its effects are forecast to be short-lived so take advantage of it while you can. By Monday winds are forecast to be back out of the south and fairly stiff. It is timed quite nicely for weekenders.

Date: April 16, 2011, 7:14 PM CDT

A trans-Gulf migration is visible at Brownsville and approaching Corpus Christi at 6:00 pm. Other stations are not showing bird migration but I suspect that the flight arriving over the extreme southern coverage area will reach shore later this evening. Whether birds will land and stay through the night depends on their condition upon arrival. Upper winds measured this morning were N and strong to very strong still at Lake Charles and New Orleans late this afternoon. Birds bucking this wind all day should land at coastal stopover sites, but yesterday's events shows just how resilient migrants can be under the intense selective pressure to push on to the breeding grounds with all possible haste.

I spent yesterday morning at Sabine Woods near the Texas/Louisiana border. Very few migrants were present and none had arrived when I departed at noon. Cliff Shackelford arrived there at 2:00 p.m. and by 3:00 saw hundreds of migrants arriving including several hundred Baltimore Orioles. We went back this morning, confident that the strong N winds overnight would have kept the birds Cliff saw on the ground. Not so. It was quite obvious that the great majority of the migrants that had arrived from mid afternoon on had stayed a short while and then continued their migration. The lift-over imagery can be viewed using rap.ucar.edu/weather/radar. We saw exactly 2 of the several hundred Baltimore Orioles Cliff had reported the preceding afternoon. It is obvious that these events are extremely ephemeral so timing is all-important in whether one's experience is of a mediocre or a monumental migration event. Especially it is

important not to assume that birds will be sufficiently taxed that they will remain at a stopover site overnight. Some will, but most will continue migration under some quite severe circumstances.

Date: April 20, 2011, 7:22 PM CDT

Just returned home from a 10 day swing up the (Texas) coast to the Louisiana border and back late this afternoon. At this hour only Lake Charles is showing incoming migrants and they are pretty heavy for so late in the day. The upper winds remain moderate (20-30 kts.) and apparently will remain so for the next several days. A front lies stationary across the northern parts of the two states and is not forecast to reach the coast. Thus the forecast is for moderate to fairly strong (upper) southerly winds to continue through the Easter weekend. Despite this, I think that trans-Gulf migrants will continue to be present in coastal stopover sites, perhaps not in large numbers, but the variety should be good simply due to the date. If you can deal with the Easter beach crowds it will probably be worth your time to check out the nearest coastal site. By now, almost all the breeding species of the south have arrived and are on territory, so activity inland will be subdued (from a migrant point of view). The next 15 days are the peak of the spring season so do get out and enjoy it.

Date: April 21, 2011, 10:33 PM CDT

The daily flight is notable for beginning early in the day. The upper air soundings are all in the low 20 kt. range (except New Orleans where, as always it seems, the upper winds are dramatically lighter - half or less than those at adjacent Lake Charles; could someone familiar with meteorological conditions over there enlighten me on why this is so?).

Checking the VAD wind profiles which measure wind speeds through the altitudinal range indirectly, by measuring the speed at which objects in the atmosphere are moving, we find "winds" of 50 kts. at 2000 - 3000 ft. The difference between that and the speeds as measured by radiosonde (weather balloon) is equal to the speed of objects - surely birds at those speeds - moving through those layers of the atmosphere. The relatively high flight speeds - 30 kts. or so, would suggest that we are seeing very strong-flying birds, probably shorebirds, as opposed to small songbirds. That would also help explain the early hour at which these migrants are arriving.

I have been suitably chastised for denigrating the drama of migration inland at this period of the migration season. I acknowledge that I was in error. I guess I was thinking about the rash of FOS reports, now past, that often are posted from the breeding grounds of southern nesting songbirds earlier than those same species are seen at coastal stopover site (for the reason that they did not stop over, but rode the prevailing south winds right on over the coastal zone - the coastal hiatus of Lowery. It is now the period for passage migrants inland and these should remain exciting for the next three or so weeks.

Date: April 22, 2011, 1:03 PM CDT

Strong trans-Gulf flights are being observed at all stations. Radial velocity images show most flights skewed to the NNE. Some of the strongest reflectance is still offshore, especially at

Corpus and Houston (where the heaviest activity is in the SE quadrant of the "doughnut" shaped image indicative of birds overflying the radar site; this will put actual landfall of the heaviest part of the flight from Galveston Bay eastward). As usual, upper winds drop off eastward, although not as dramatically as is often the case. New Orleans has birds making landfall in the Houma area and tending NE toward the city (and many well beyond no doubt). Wind speeds are in the 40+ (to almost 50!) kt range in the 2000 - 4000 ft. range as measured by VAD Wind Profiles, well above the middle 30's as measured by radiosonde. Again, the difference in the two measurements indicate powered flight (surely birds).

Texas stations are suffering from ever worsening drought, aided by the seemingly ceaseless dry winds. That some coastal stopover sites continue to report reasonable birding is a reflection more of the peak traffic rate period than anything.

Date: April 23, 2011, 1:50 PM CDT

We are stuck in a pattern, but it is a good pattern, with a significant trans-Gulf flight every day. Much preferred to desperately trying to see bird movements when there few or none to be seen, which is sometimes the case earlier in the season. I might wish for a little weather to add some drama, but I'm sure the birds are just fine with it the way it is. With all the sites but one (New Orleans) in the super sensitive "clear air" mode it is easy to get carried away and mistake all the red and pink (very high) reflectance, which somewhat resembles an atomic blast on the display, for a massive migration. Checking the New Orleans display; which is in the filtered "precipitation mode" due to some scattered small showers in southern Mississippi, shows a modest flight at this hour. Real flight speeds are a significant 18 kts. over passive movement of material like pollen, dust, salt crystals, and aerial plankton (the soup of small insects and other invertebrates that drifts with the wind currents) - way to high a speed to be anything except birds (this at Lake Charles; flight speeds at other sites vary slightly with the ambient wind speeds). Frankly, given the date I am a little surprised that the flight is no heavier than it is. This was measured about 13:00. It may have been heavier earlier or perhaps will be heavier later.

So the situation from all this rambling is one of a significant, but not huge, trans-Gulf flight. Translated into birds on the ground in coastal stopovers, yes, there will be some, but likely to be higher in variety than in numbers (and for most birders that works just fine). Having the Easter Weekend fall so late in the month gives birders a holiday weekend near peak migrant traffic time.

Date: April 24, 2011, 12:27 PM CDT

All NW Gulf sites have nice doughnut-shaped reflectance, indicating birds overflying the stations (this reflectance pattern caused almost surely near 100% by birds). There is the added evidence of air speeds of targets well above wind speeds, indicating powered flight. Reports from the field are variable, most concentrate on high variety, which is certainly nice for the observers, but it is not an accurate gauge of the magnitude of a migratory flight, where sheer biomass is the gold standard. Hopefully the coming weather system (midweek in the Wed/Thursday time frame) will give us a touch of both variety and numbers.

Date: April 25, 2011, 1:14 PM CDT

The NEXRAD displays are like the proverbial broken record (you have to be of a certain age to know what that sounds like). All displays are showing heavy flights (except New Orleans where the flight is so far only moderate on lighter winds). Did I mention the winds? Yes, they continue and have cranked up a notch or two. While they are conveying large numbers of migratory birds "home" safely and in a very expeditious manner they are getting rather tiresome here on the ground. I forgot to check the forecast discussion for an update on the much anticipated weather event coming up in a couple of days (or three if you live farther east), Yesterday was calling for dry frontal passage Weds. afternoon on the Texas coast. Extrapolating that would probably mean Thursday morning on most of the Louisiana coast.

Post-frontal winds are forecast to be brisk with yet another wildfire event in Texas (how many has that been this spring? I've lost count). Unless there is radical change Texas faces a really mean summer. The good news is that La Nina is abating toward a neutral pattern. But I digress. All that will occur well after the spring migration season has passed.

Date: April 26, 2011, 2:13 PM CDT

A curious situation exists. Both Brownsville and Corpus are (or were at 7:00 am) registering winds dramatically lower (a third or less) of their speeds for the past couple of days. At Brownsville at least this certainly was not the case at the surface where winds 30 kts. with higher gusts continue. Lake Charles and New Orleans were both in the mid 30 kt. range. I should add that the VAD wind profiles are still showing the little triangles on their wind arrows that indicate 50 kt. wind speeds plus birds at the levels (3-4000 ft.) at all stations. I can only assume that some sort of temporary anomaly existed aloft when the radiosonde were released and this quickly corrected itself. A real anomaly - not inconsequential rainfall - occurred last from from Houston eastward (though the city itself missed out). I noticed that Lake Charles had posted flash flood warnings (!).

Well, to what the subject line says this post is about; impressive "migration rings" are displayed at Houston and Lake Charles. The birds are surprisingly high, indicated by the wide, relatively clear "doughnut hole" inside the ring of fairly strong reflectance. Birds normally fly at those altitudes (and higher) over the open Gulf, but descend a bit over land. Migration that is entirely over land may be dramatically lower (1000 ft. or less), thus enabling observers with good hearing to pick up the various chips and seeps of passing migrants. New Orleans still has lingering thunderstorms and the flight seems somewhat lighter, though this may simply be a knee-jerk reaction on my part to the fact that the radar is in precipitation mode, meaning that the display is subdued from the "nuclear blast"-looking images of the clear air mode images from Houston and Lake Charles.

Back to west, Brownsville has a lowish "migration ring" signature and Corpus has no ring at all with most of its heavy reflectance over the Gulf. So I'd say that light (west) to fairly heavy (east) trans-Gulf flights were occurring across the entire region.

That brings us to tomorrow and beyond: the front is forecast to clear the coast here during mid to late morning and Houston by midday. Frontal passage in Louisiana will be late afternoon and overnight (but you may get more rain with it). The front is not the "perfect storm" we might wish for, but given the situation most of the spring we can be grateful for whatever we get. Simply based on the date I would be surprised if moderate to pretty good fall-outs did not occur at coastal stopovers from late tomorrow afternoon through Thursday.

Date: April 27, 2011, 6:57 PM CDT

Yet another dry front pushed off the South Texas coast about 09:30 this morning. It has yet to clear New Orleans, which is the only station showing incoming birds. Birds are incoming at the other stations however despite what the radar displays indicate. I spent the day on South Padre Island with David Benn. There were a few migrants around when we arrived, not long after frontal passage. The NW winds were still light for the first hour or two and strengthened steadily after that. Birds increased through the morning and early afternoon and then seemed to enter a holding pattern which lasted the rest of the afternoon. What may have happened was the increasing NW winds (30 kts. or so) began to impede the incoming flight, or perhaps that's all the birds there were to come in, but I don't really think that was likely. It was a day of high variety and moderate numbers. A highlight was at least 2 and possibly 3 male Cape May Warblers and half a dozen Blackpolls.

Date: April 28, 2011, 4:59 PM CDT

As I have come to expect, under the gusty N (W at New Orleans; NE elsewhere) wind conditions that have existed all day only Brownsville is showing bird migration on its display (incoming birds moving NW from the Gulf across, as opposed to directly into, the NE winds - still not an ideal situation for migrants. The only explanation I can provide for this seeming anomaly is that incoming birds (and all reports from the coastal sites are glowing) is that birds are "on the deck", too low to be seen on radar, trying for that slight reduction in head wind speed they get within a few feet of the water. Today's date, April 28 has special significance for me. April 28, 1998, began an amazing series of events on the petroleum platform upon which I was stationed about 80 miles offshore from Vermillion Bay, Louisiana, that culminated in a flight of trans-Gulf migrants, nearly all below eye-level, that we (perhaps not too conservatively) estimated as upwards of a million birds. That flight actually took place the following night into a N wind, but a not-so-strong one as today's. So I have since considered April 28-30 to be The Peak of trans-Gulf migration.

Date: April 29, 2011, 3:51 PM CDT

Winds veered back to the SE and strengthened through the day (but are still quite light in Louisiana). With them we returned to the familiar pattern of incoming migrants, many of which will continue inland with a predictable fraction (more due to the high traffic rate of peak season) dropping into coastal stopovers. And there will be holdovers from the peaks of yesterday and the day before around for a few days so the weekend will still be worth a trip to the coast. The next round of fairly heavy migration action on the ground appears to be on tap for Monday and Tuesday with the promise another front. The weather people are even whispering about possible

rain, even in Texas where most have given up hope. I won't be so bold as to back them up on that, but it does sound like next round may be interesting.

Date: April 30, 2011, 3:32 PM CDT

Strong upper winds (35-40 kts) prevail except for the usual sharp drop between Lake Charles (41) and New Orleans (18). Nonetheless, all stations are tending to show the "migration ring" signature shaped display. Birds appear to be angling offshore just north of Brownsville, passing mostly offshore from Corpus and coming onshore east of Victoria. At Lake Charles a heavy migration seems to be landing somewhere south of Fort Polk (i.e. not too far inland despite the strong tail winds). The surface winds are ridiculous and greatly impair birding except in exceptionally shielded locations. The promised frontal passage is now forecast to move offshore Monday night - not optimal timing to cause a fallout. Late Tuesday afternoon may end up being the best it gets.

I plan to cease daily summaries of activity as seen on NEXRAD about May 5. Trans-Gulf migration tends to fall off rapidly after that date. Much of May's migration activity is Empidonax flycatchers, sparrows, and other species whose routes are mostly circum-Gulf. If significant events are unfolding on radar displays I will, of course, report it, but reports will not be daily.

Date: May 1, 2011, 1:33 PM CDT

Just when you thought it couldn't get any windier. . . . VAD wind profiles show some of the highest wind speeds (uniform 55+ kts except at New Orleans where winds were downright tranquil) I have seen displayed all season from just above the surface up through the altitudes at which birds usually migrate in the Gulf of Mexico region. I have to wonder at what speed a tail wind becomes a liability due to control factors. Assuming that these winds are within the range that birds find advantageous (and the displays bear this out) birds are really making time today. All stations except New Orleans show strong "migration ring" signatures indicating that the stations are being overflowed by lots of birds today. Intrepid birders willing to brave the winds have been finding a good variety of species at coastal stopovers, if low in overall numbers. Some inland locations, not surprisingly, are reporting species lists that rival those at coastal sites. I expect this overall trend to continue until frontal passage tomorrow night. This front is promising to kick up some weather along and ahead of the actual frontal boundary and to bring some pretty radically lower temperatures. Enjoy it; it may be the last one this season. I still think that Tuesday afternoon will be the best time to be on the coast, although Wednesday may be pretty good as well.

Date: May 2, 2011, 7:59 PM CDT

The National Weather Service threw me a ringer by updating frontal passage time to late morning instead of late afternoon (locally here in Brownsville). So for those west of Houston I'm sorry for blowing the prediction. From Houston eastward the front is approaching Lake Charles where NEXRAD shows an incoming flight just ahead of it. The radar displays at Brownsville, Corpus Christi, and Houston are not showing bird echos except for a thin pathway right along the shore. This is almost entirely a river of Franklin's Gull streaming right up the barrier islands. We

were present on South Padre Island about an hour and a half before frontal passage which occurred at 11:55. This enabled us to get a baseline of migrants present (some recognizable individual birds have been present since the last front over a week ago). Though the frontal passage was pretty impressive in its blustery, cloudiness (and about 3 drops of rain) there was not the drama I had hoped for in bird response. Nor did a particularly impressive number of birds pile into the small planted woodlots during the afternoon. There was plenty of activity with a pretty good variety but far from overwhelming. So I think tomorrow will likely be good. The front lies about 75 miles offshore on a mostly N-S line from the lower Texas coast to near Lake Charles. Today's main flight is probably delayed by the gusty headwinds. Tomorrow looks good for the whole region as winds are forecast to persist northerly through the day tomorrow and into Wednesday.

Date: May 4, 2011, 2:46 PM CDT

My apologies. My internet connection was down from last night until a few minutes ago so I missed a day of activity that ranged from good to spectacular depending on where you were. The spectacular reports were all from deep inland sites in Texas for the most part with the coast being good to very good depending on who you asked. It was a "season saver" for those that could get out and enjoy it.

Today things have settled down on the radar but there are small numbers of bird echos inbound. Winds are fairly light (15 kts with higher gusts) and NE across the region. With winds veering around to the south again tonight as forecast I expect there will be another pretty solid lift-off image this evening as dusk. I assume there was a heavy lift-off last evening but I couldn't check. This afternoon's arrivals plus hold-overs from the past two days should make for pretty good birding. Some of the recent arrivals I saw in the field yesterday were so exhausted that some were seriously in danger of being stepped on. Birds in that state will be around for a few days.

Date: May 5, 2011, 5:04 PM CDT

Winds in the elevations that migrating birds favor for trans-Gulf migrations remain light for one more day. Light winds aloft do not favor migration and little is evident on the various western Gulf radar displays. Bird arrivals between now and early next week appear to be likely limited. Birding is still reported rewarding at most coastal as well as inland contributing sites. Much of that activity is due to lingering individuals from the event early this week. Some of these lingerers will likely be around for several more days. Late season migration seems to lack the same urgency that is evident earlier as more female and first year males, who may not breed this season anyway, tend to dominate the mix. Likewise there is a shift to some degree toward a circum-Gulf movement. Vagrants tend to appear among the late season birds moreso than earlier (an incentive to monitor migration throughout its waning days).

I will continue to report on bird movements observed on radar when they occur, but daily updates end today.