

An examination of the migration routes and stopover ecology of the Cerulean Warbler (*Dendroica cerulea*)

IV Congreso Norteamericano de Ornitología

SS15: The Promise of Multi-stakeholder Management Initiatives for
the Cerulean Warbler

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Why consider migration and migration routes?

- Season is generally not as well understood as breeding or non-breeding resident
- Could regulate population sizes by increasing or decreasing mortality and condition
- Might be key differences between spring (northbound) and fall (southbound)
- Could have major conservation implications, particularly if migration is concentrated (or not) in relatively small portions of the range

Summary of published information, Primavera (Marzo y Abril)

- Panama (Ridgely 1976): **rare** transient, mid- to late March
- Costa Rica (Stiles & Skutch 1989): regular only along Caribbean coast in April, occasional records inland
- Honduras/Mexico (Howell & Webb 1995): **uncommon to rare** transient late March to early May on Atlantic slope
- Belize (Jones 2003): **common** transient at higher elevations in Maya Mtns, scarce in lowlands, late March to late April
- Cuba (Garrido & Kirkconnell 2000): **very rare** transient, April
- West Indies (Raffaele et al. 1998): **very rare** migrant [less frequently in April]; Bahamas, western Cuba, Jamaica, Cayman Islands
- Trans-Gulf migrant (Hamel 2000)
- Spring route to the west of fall route (Dunn & Garrett 1997)
- United States: Majority of migrants from upper Texas coast to SW Louisiana; smaller numbers east to Florida panhandle; rare in spring on Florida Gulf Coast and Keys and in S Texas and Texas hill country (Dunn & Garrett 1997)

Summary of published information

General:

- Trans-Gulf migrant (Hamel 2000)
- Spring route to the west of fall route (Dunn & Garrett 1997)

Primavera (Marzo, Abril)

- Panama: **rare**
- Costa Rica: regular only along Caribbean coast in April
- Guatemala: **rare** in Peten
- Honduras/Mexico: **uncommon to rare** on Atlantic slope
- Belize: **common** transient in Maya Mtns, scarce in lowlands
- Cuba: **very rare**
- West Indies: **very rare** Bahamas, western Cuba, Jamaica, Cayman Islands
- United States: upper Texas coast to SW Louisiana; smaller numbers east to Florida panhandle; rare in spring on Florida Gulf Coast and Keys and in S Texas and Texas hill country

Otoño (Agosto, Septiembre, Octubre, Noviembre)

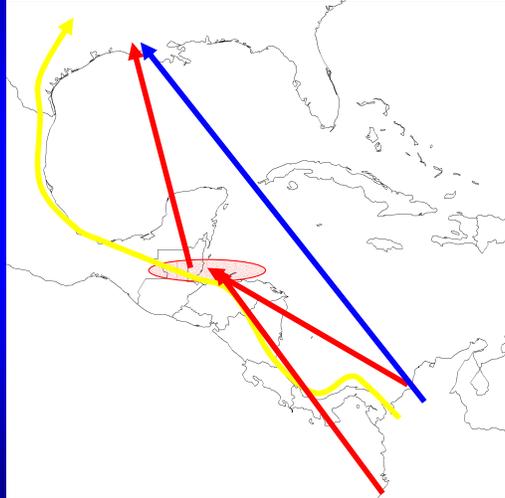
- Panama: **uncommon**
- Costa Rica: **rare to sporadically common** Caribbean lowlands and foothills; small numbers in Pacific Slope
- Honduras/Mexico: **uncommon to rare** on Atlantic slope
- Belize: **uncommon to very uncommon**
- Cuba: **very rare**
- West Indies: **very rare** Bahamas, western Cuba, Jamaica, Cayman Islands
- United States: casual in Texas and SW Louisiana, more numerous from SE Louisiana to Florida, including entire peninsula

Summary of published information, Otoño (Agosto, Septiembre, Octubre, y Noviembre)

- United States: casual in Texas and SW Louisiana, but more numerous from SE Louisiana to Florida, including entire peninsula (Dunn & Garrett 1997)
- West Indies (Raffaele et al. 1998): **very rare** migrant, Bahamas, western Cuba, Jamaica, Cayman Islands, primarily September & October
- Cuba (Garrido & Kirkconnell 2000): **very rare** transient, August to October
- Mexico/Honduras (Howell & Webb 1995): **uncommon to rare** transient mid-August to mid-October on Atlantic slope from Veracruz to Honduras
- Belize (Jones 2003): **uncommon to very uncommon** autumn transient, early Aug to early Oct
- Costa Rica (Stiles & Skutch 1989): **rare to sporadically common** fall migrant (late August or early September to mid-October) in Caribbean lowlands and foothills; small numbers in Pacific Slope
- Panama (Ridgely 1976): **uncommon** transient, late August to early October
- Fall route to the east of spring route (Dunn & Garrett 1997)

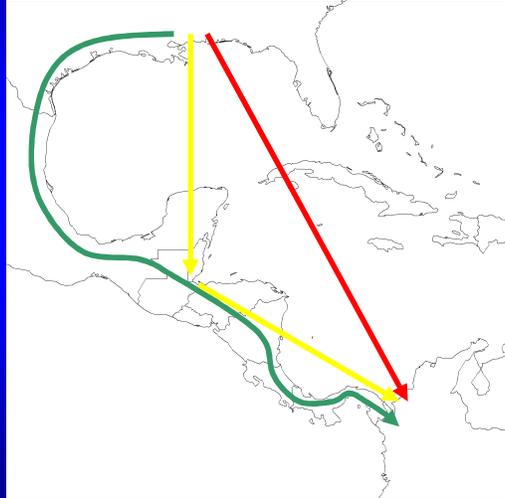
Potential migration routes (Primavera)

1. Northbound two-stage "leapfrog" route (proposed by Parker 1994); South America to northern Mesoamerica; northern Mesoamerica to Gulf Coast of U.S. (red arrows)
2. Direct overwater flight from South America to Gulf Coast (blue arrow)
3. Land route north through Central America and around Gulf of Mexico (yellow arrow)

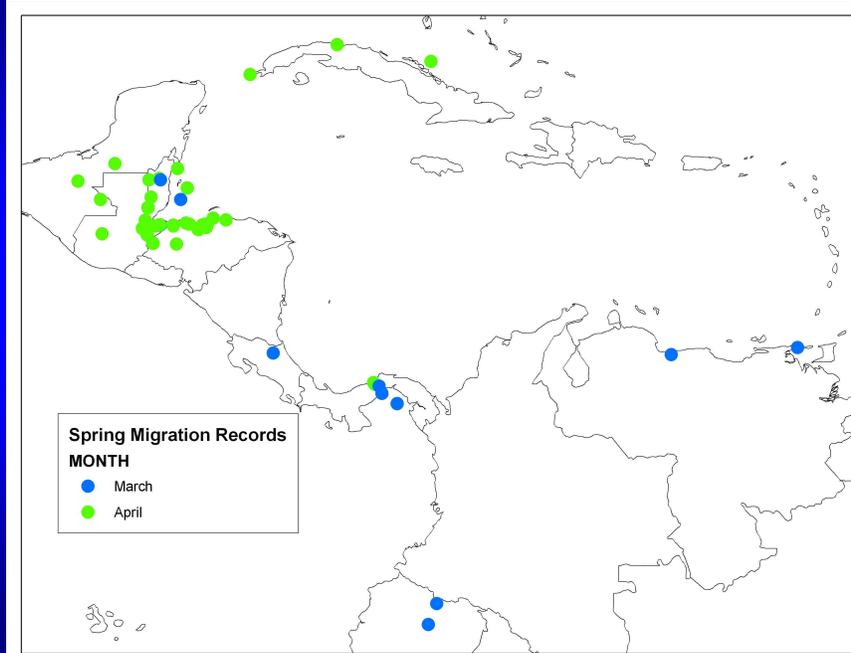


Potential migration routes (Otoño)

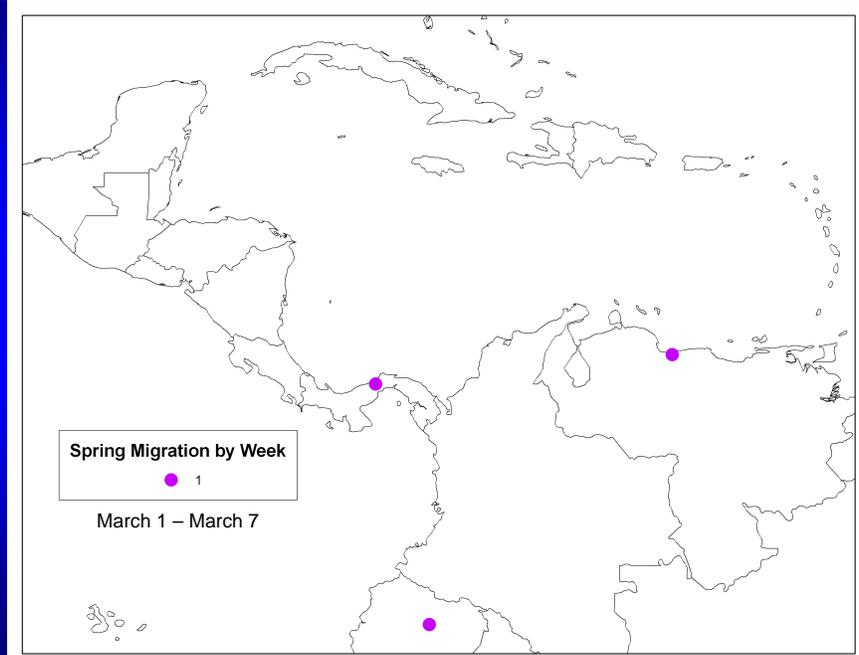
1. Direct flight, U.S. Gulf Coast to South America (red arrow)
2. Two-stage "leapfrog" route via northern Mesoamerica (reverse of spring hypothesis) (yellow arrows)
3. Land route around Gulf of Mexico south through Central America to northern South America (green arrow)



Cerulean Warbler Migration Records, Primavera

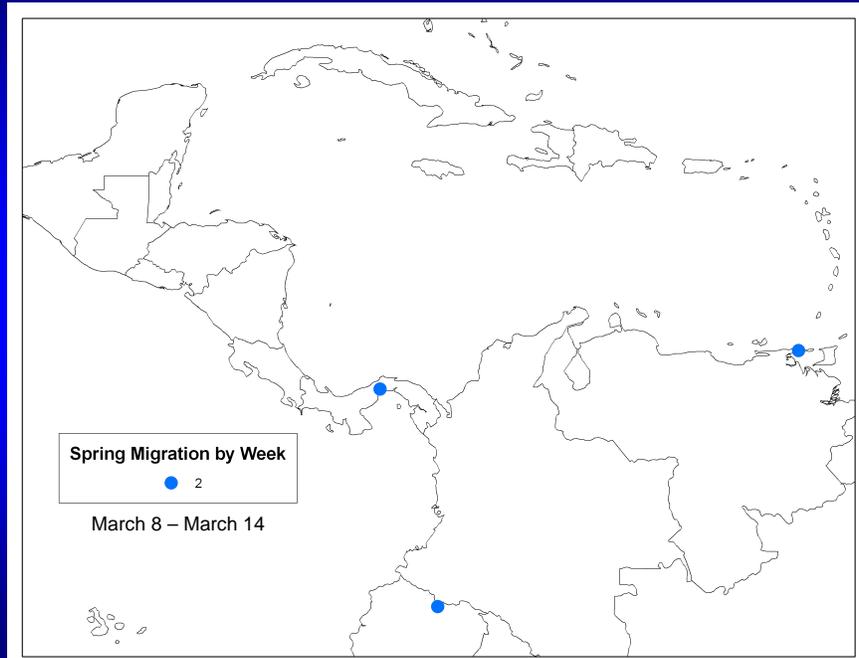


Cerulean Warbler Migration Records, Primavera



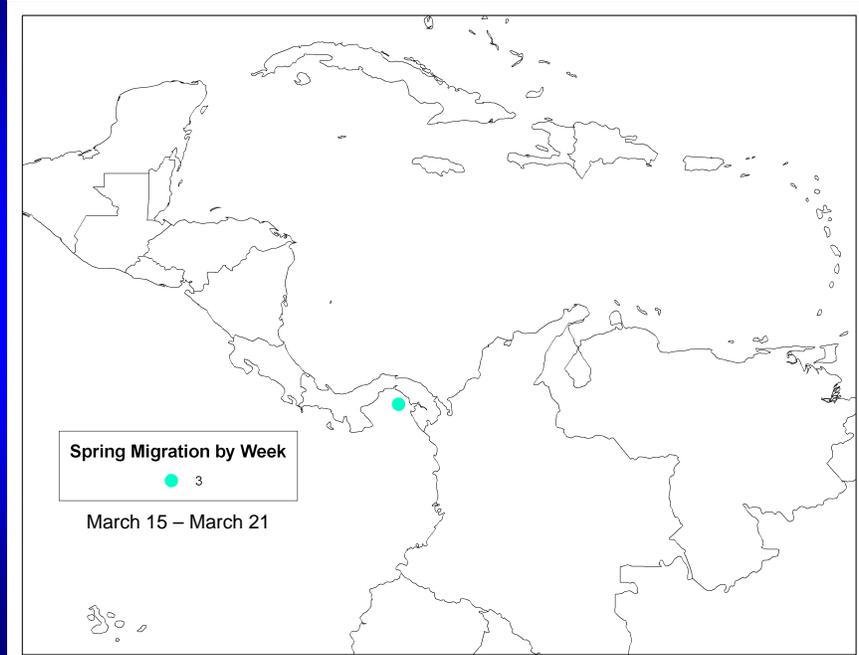
Spring week 1

Cerulean Warbler Migration Records, Primavera



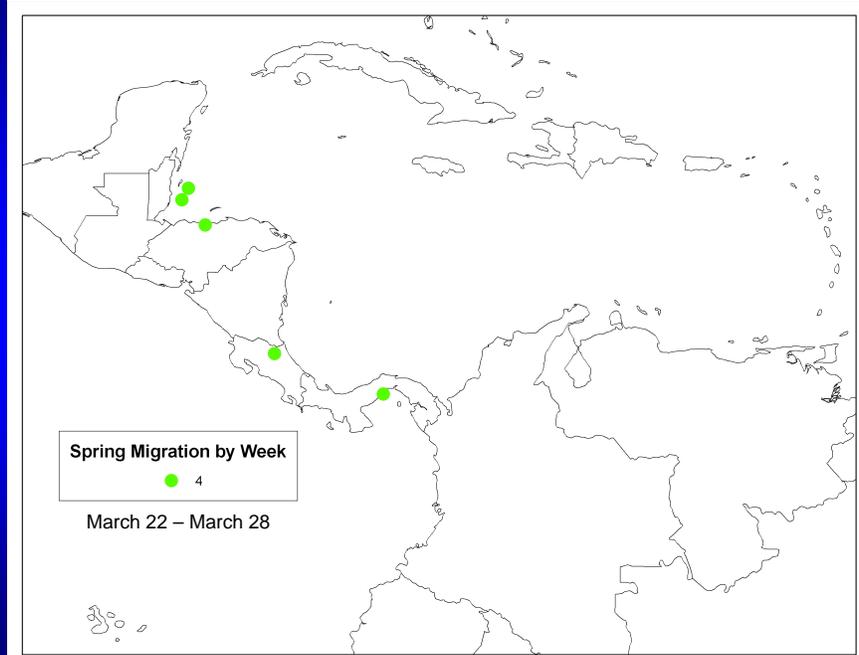
Spring week 2

Cerulean Warbler Migration Records, Primavera



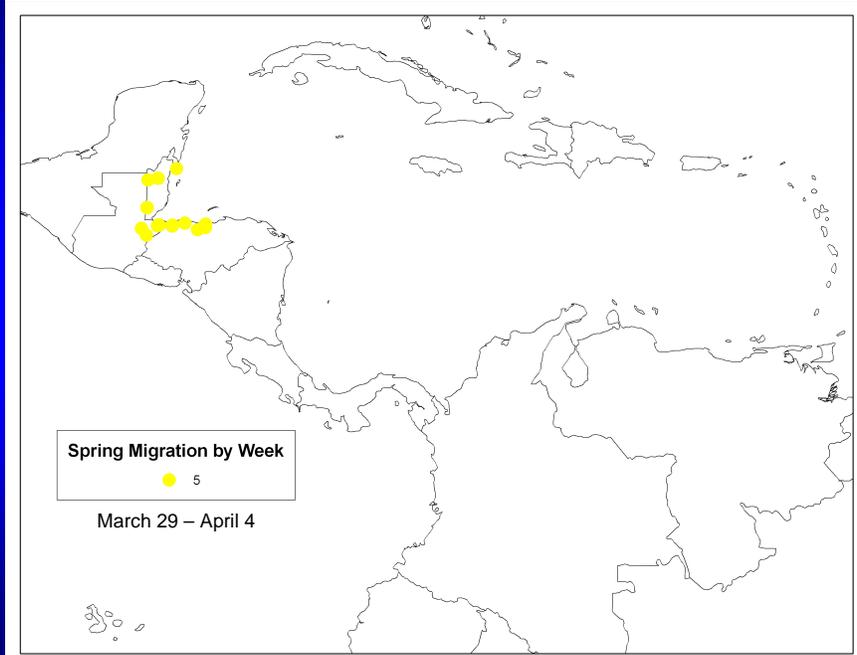
Spring week 3

Cerulean Warbler Migration Records, Primavera



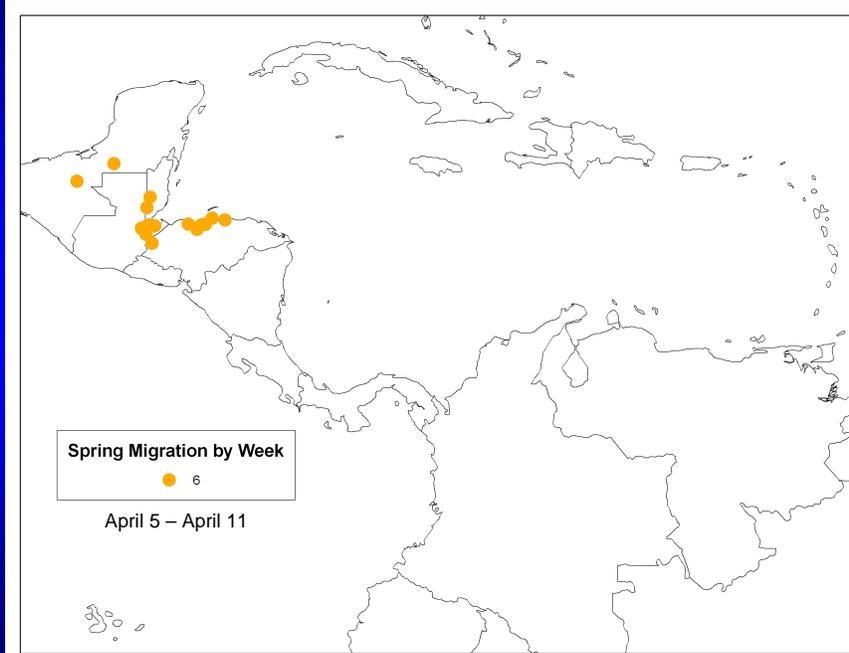
Spring week 4

Cerulean Warbler Migration Records, Primavera



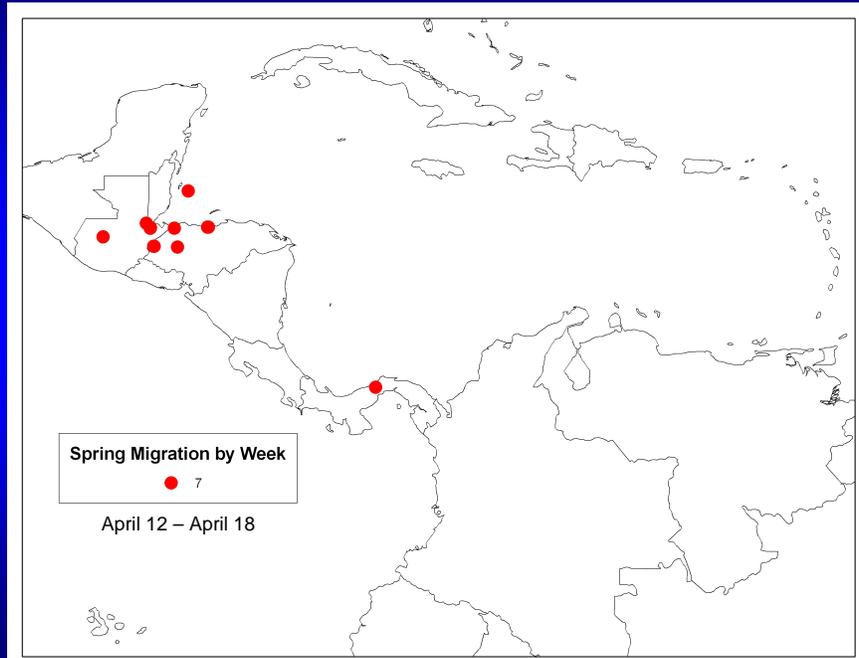
Spring week 5

Cerulean Warbler Migration Records, Primavera



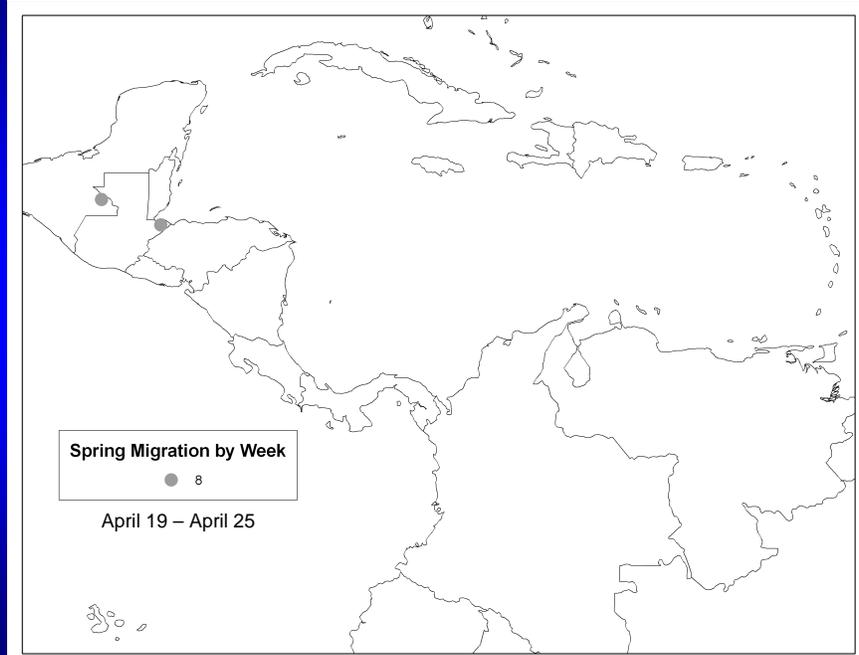
Spring week 6

Cerulean Warbler Migration Records, Primavera



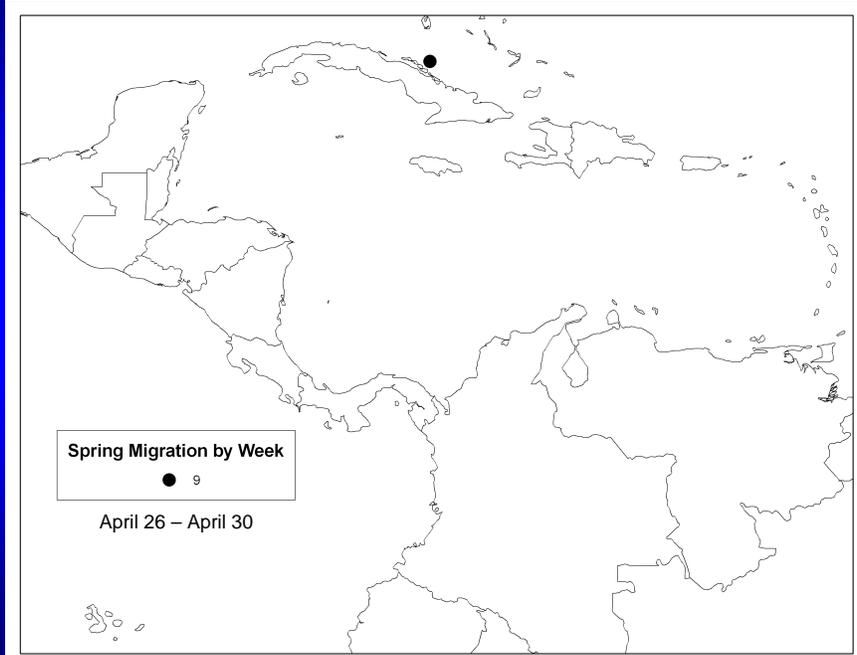
Spring week 7

Cerulean Warbler Migration Records, Primavera



Spring week 8

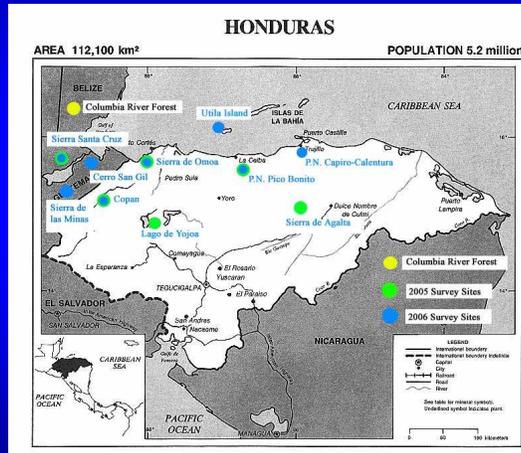
Cerulean Warbler Migration Records, Primavera



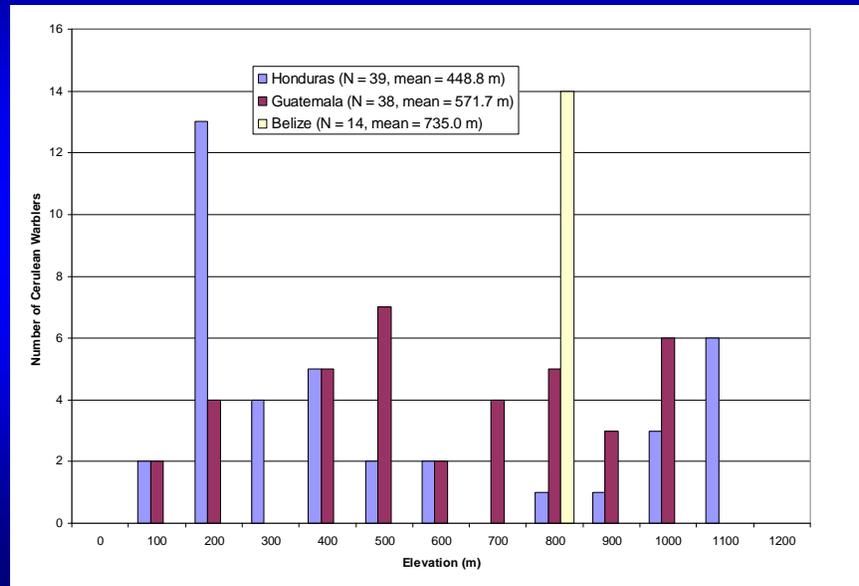
Spring week 9

Surveys for migrating Cerulean Warblers in northern Mesoamerica (Primavera)

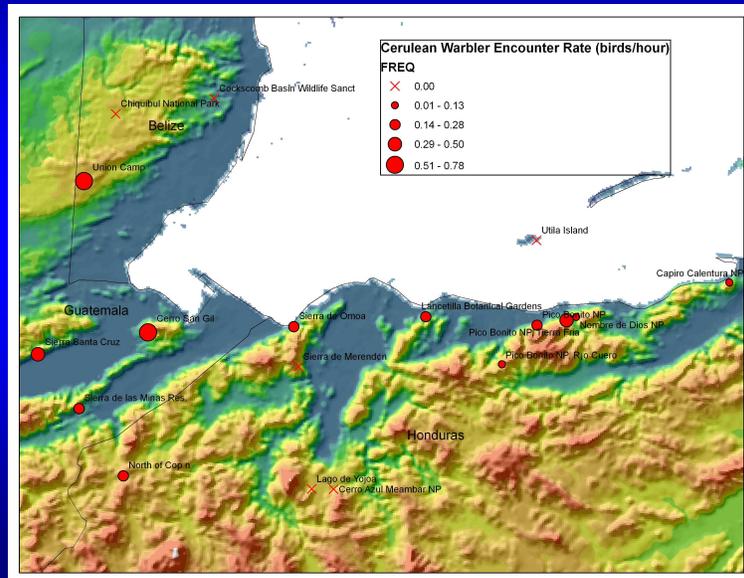
- Field surveys conducted in Belize (2004), Guatemala (2005, 2006), and Honduras (2005, 2006)
- Line transects along pre-existing trails in morning and afternoon to find mixed-species flocks and foraging individuals
- Species composition recorded for each flock
- More detailed data collected on each Cerulean Warbler detected
- Playback used to increase chance of detection



Surveys for migrating Cerulean Warblers in northern Mesoamerica (Primavera)



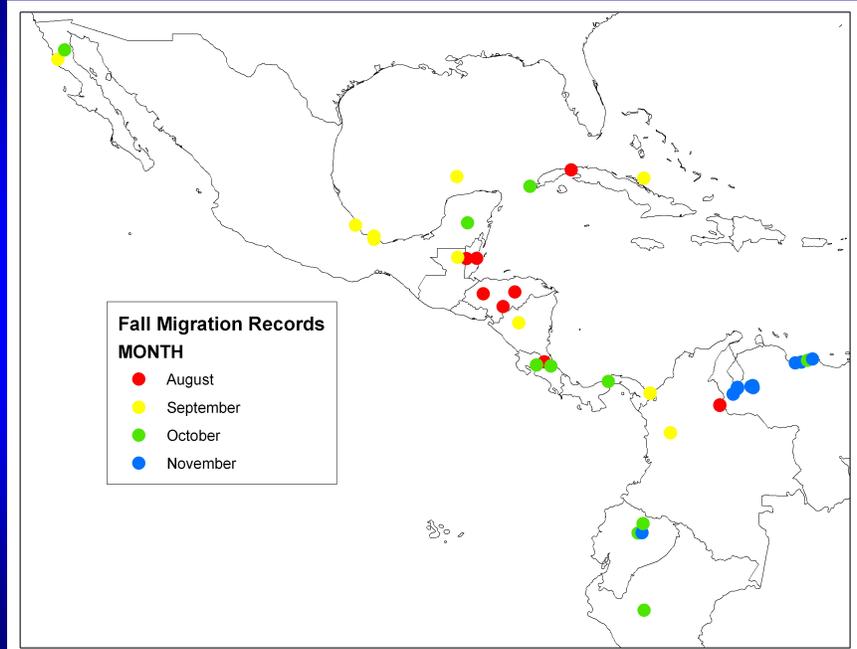
Surveys for migrating Cerulean Warblers in northern Mesoamerica (Primavera)



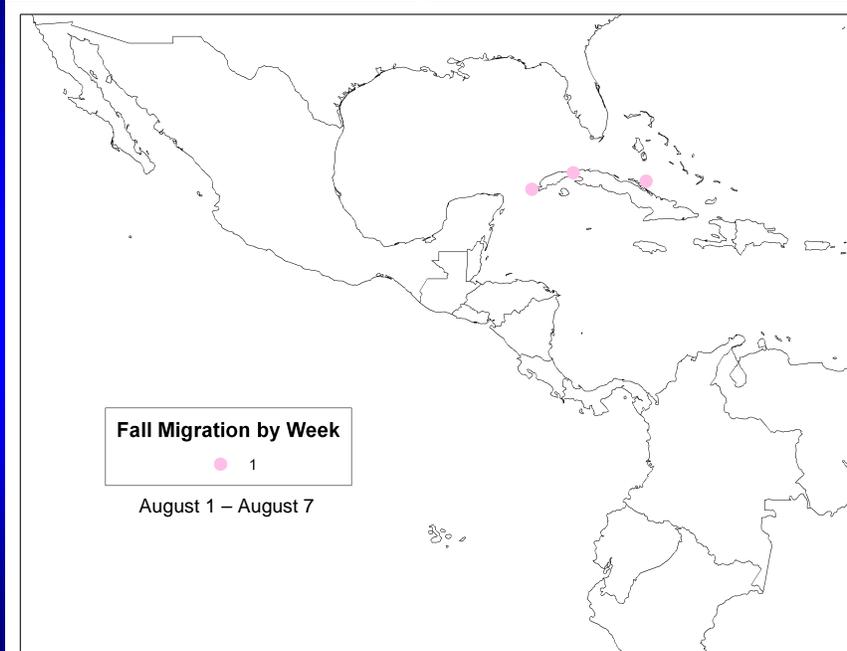
Cerulean Warbler migration: Resumen para Primavera

- Leapfrog or Parker hypothesis seems to be valid, but proportion of population using it is unclear
- Individuals apparently mostly in coastal mountain ranges on Caribbean-facing slopes in northern Honduras, Guatemala, and southern Belize
- Found at a variety of elevations (75 m – 1100 m)
- Apparently more frequently encountered to the north and west in Belize and Guatemala than further south and east in Honduras

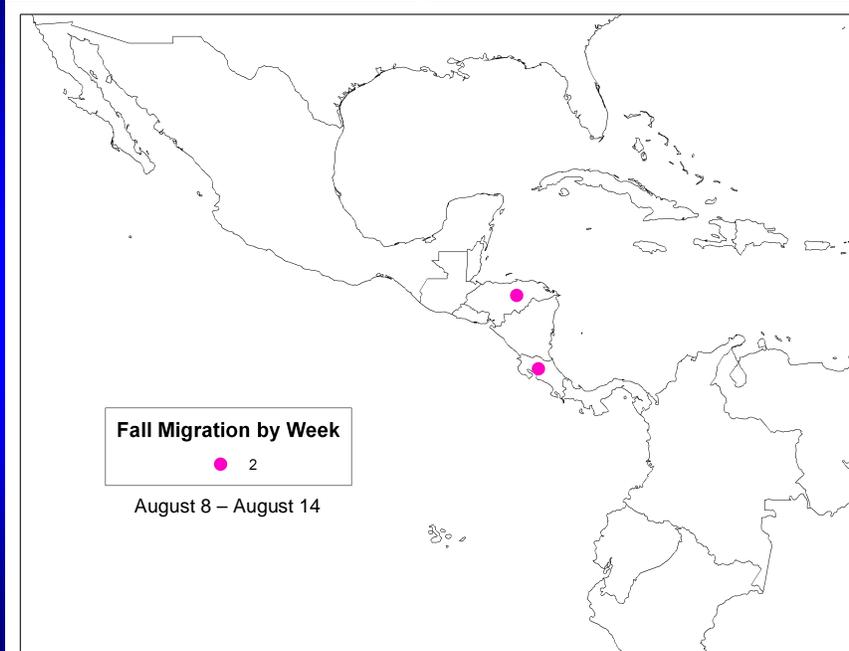
Cerulean Warbler Migration Records, Otoño



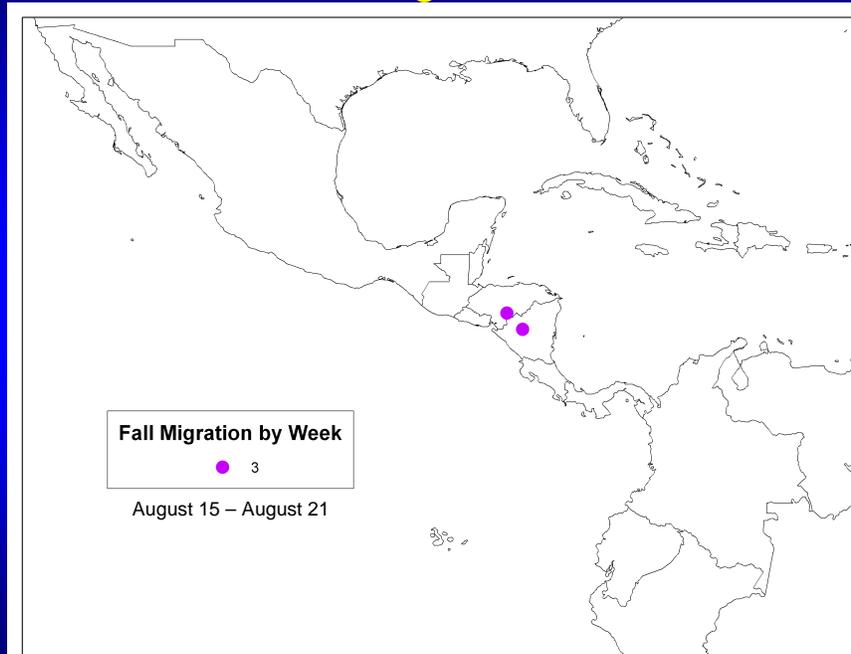
Cerulean Warbler Migration Records, Otoño



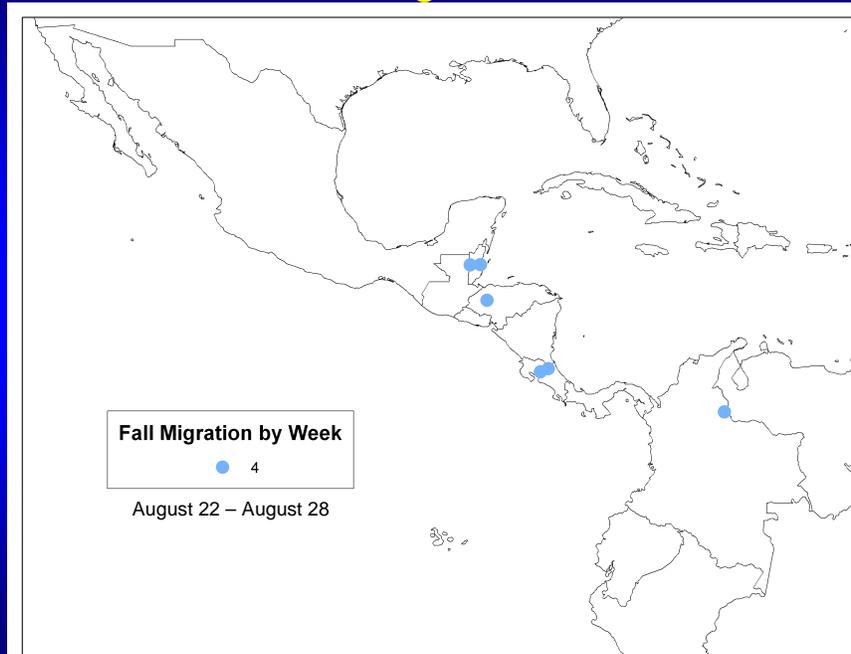
Cerulean Warbler Migration Records, Otoño



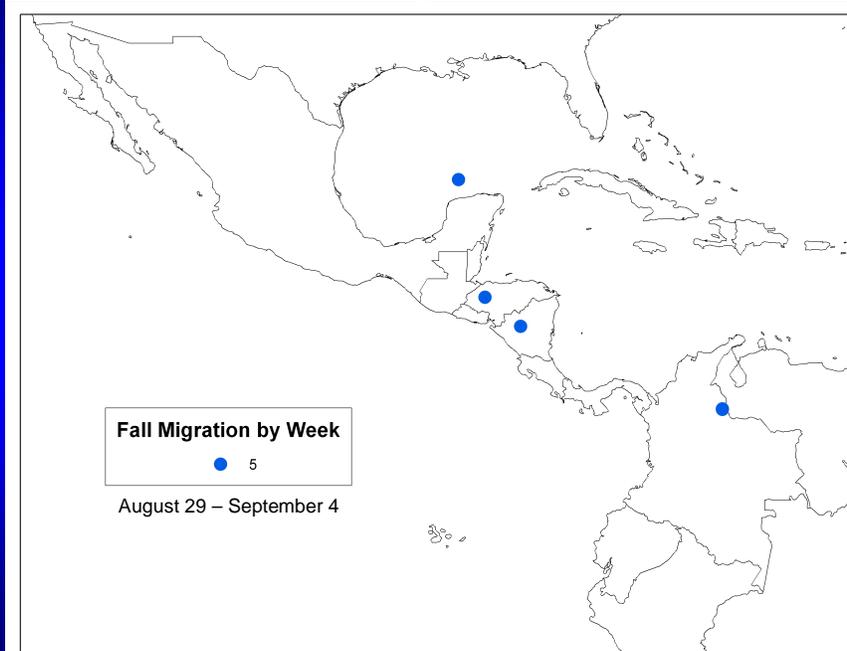
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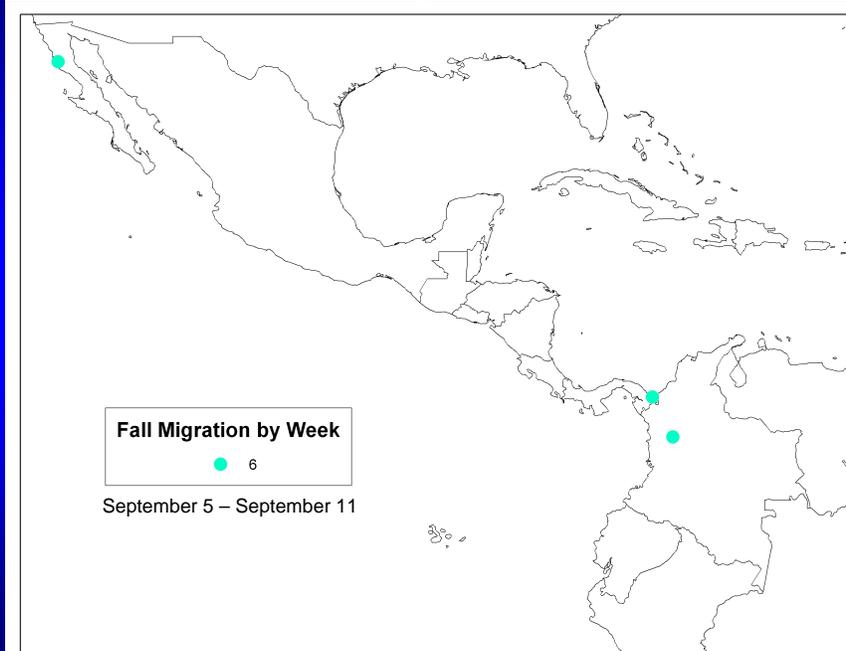
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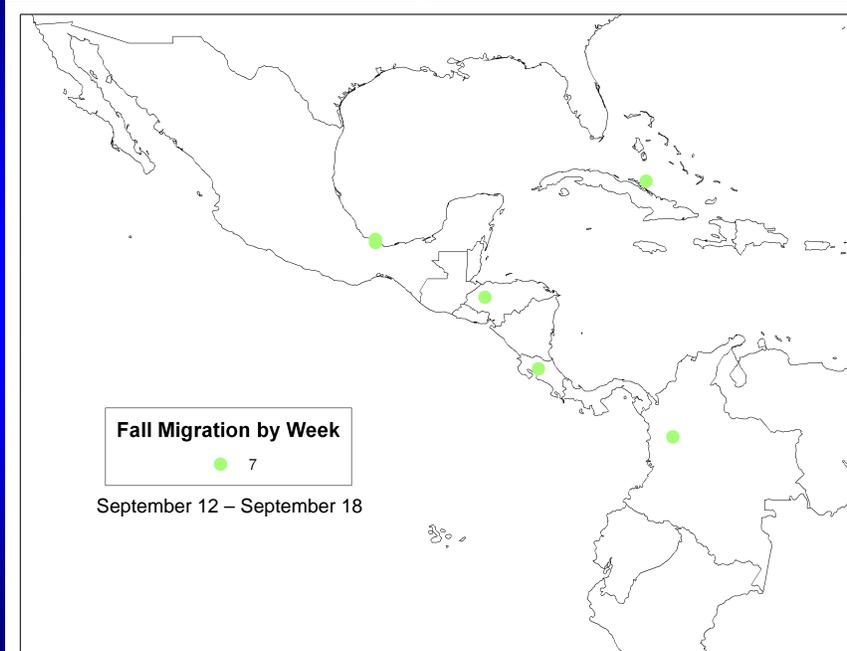
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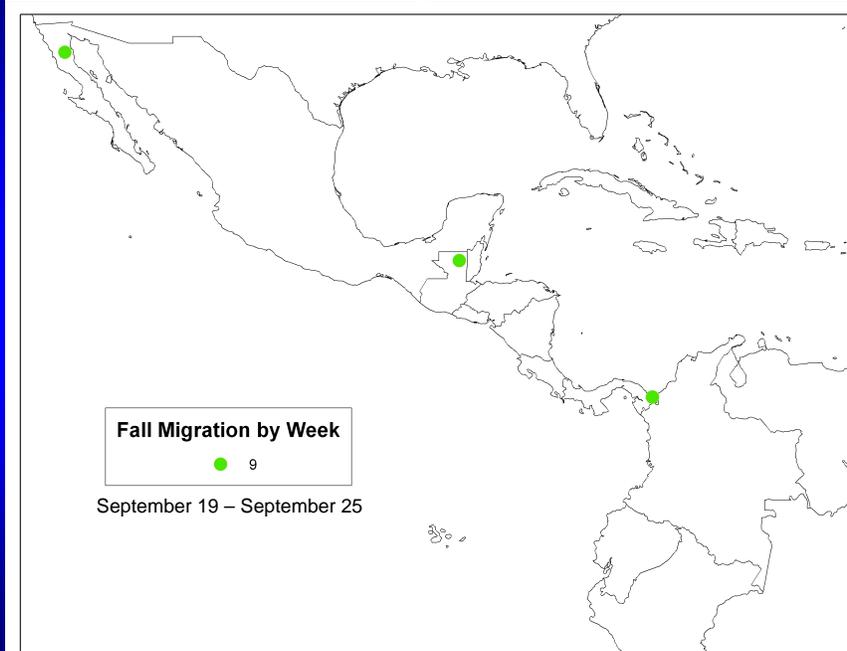
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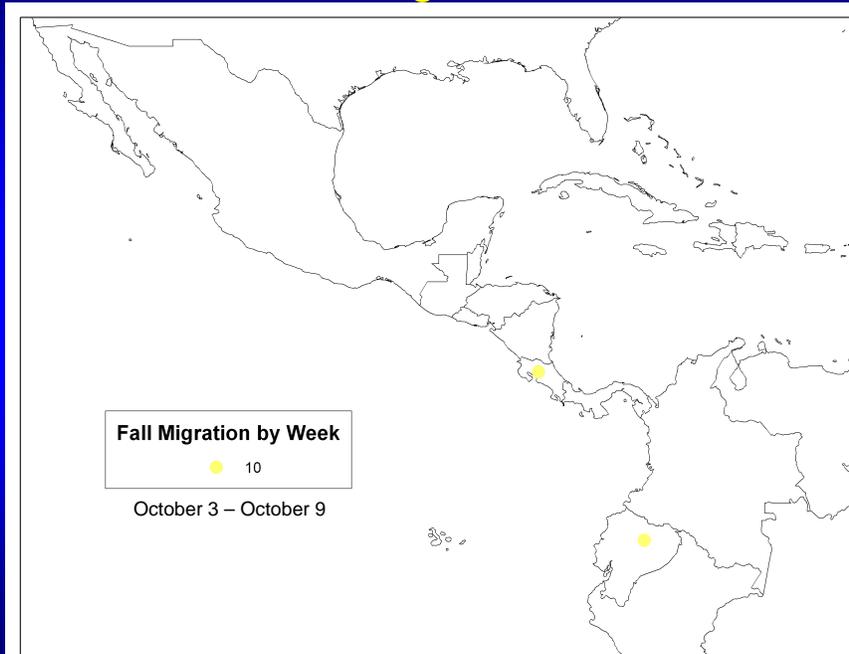
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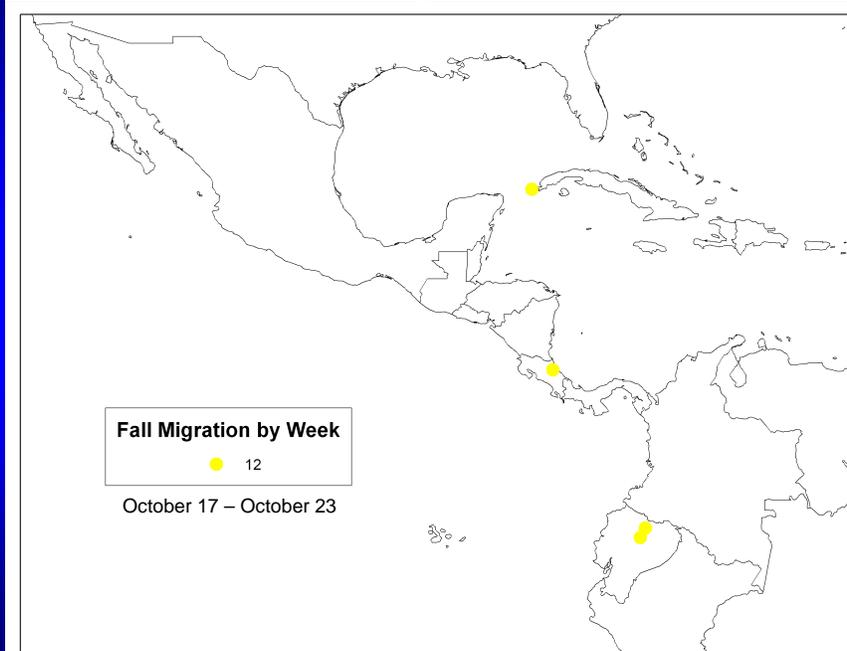
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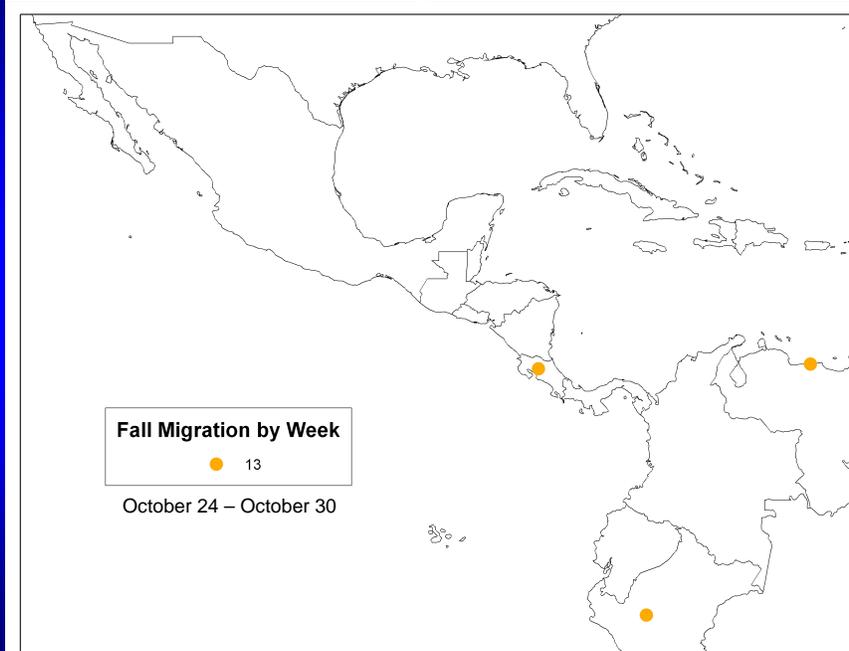
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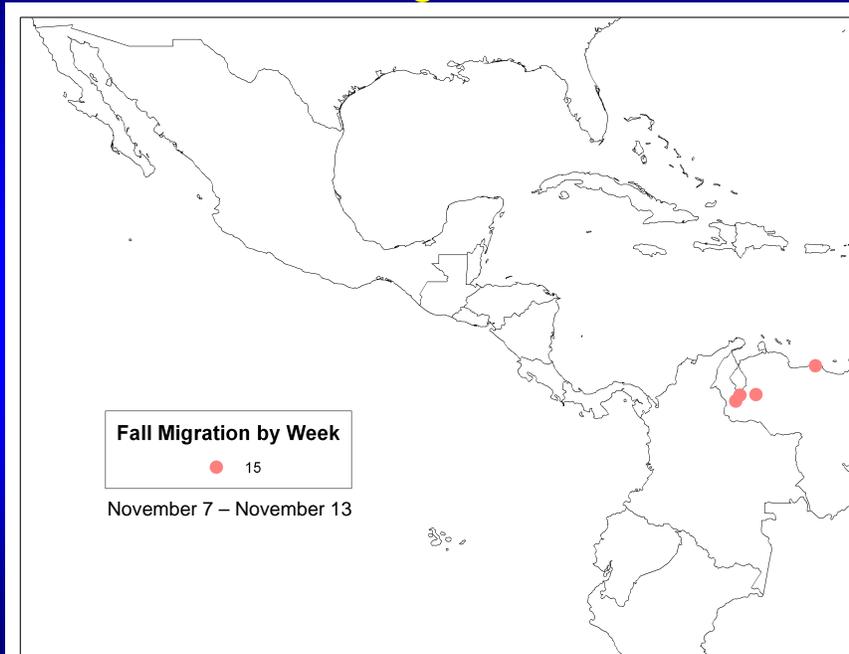
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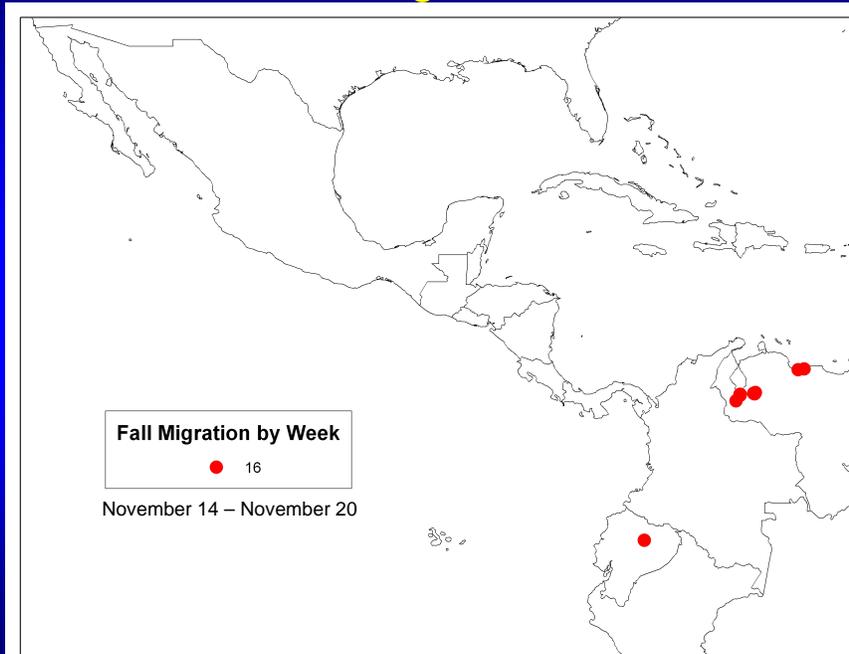
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Cerulean Warbler migration: Resumen para Otoño

- Exact route(s) still unclear; general lack of Caribbean records suggests overflight of region or another route
- Significance of Central America/Mexico records unclear; might be strays
- Cannot rule out direct over-water flight from North America to South America
- Suggestion of two “waves” of passage, one early (Aug-Sept), the second later (Sept-Oct)

Cerulean Warbler migration: Future research needs

- Need to quantify number of individuals using northern Mesoamerica in Spring to determine if significant proportion of population uses this area or not (what is the turnover rate?)
- Need to expand Spring search area to North in Belize, to South and East in Honduras and Nicaragua, and to West into Chiapas and Sierra Lacandon to better define the stopover area
- Need to determine if any concentration points exist in Fall anywhere (to help confirm or refute direct overwater flight to South America)
- Need a more systematic migration monitoring system throughout Mesoamerica
- Please enter all records of Cerulean Warbler during migration (observations, specimens, captures) in e-Bird and send to Paul Hamel (phamel@fs.fed.us)