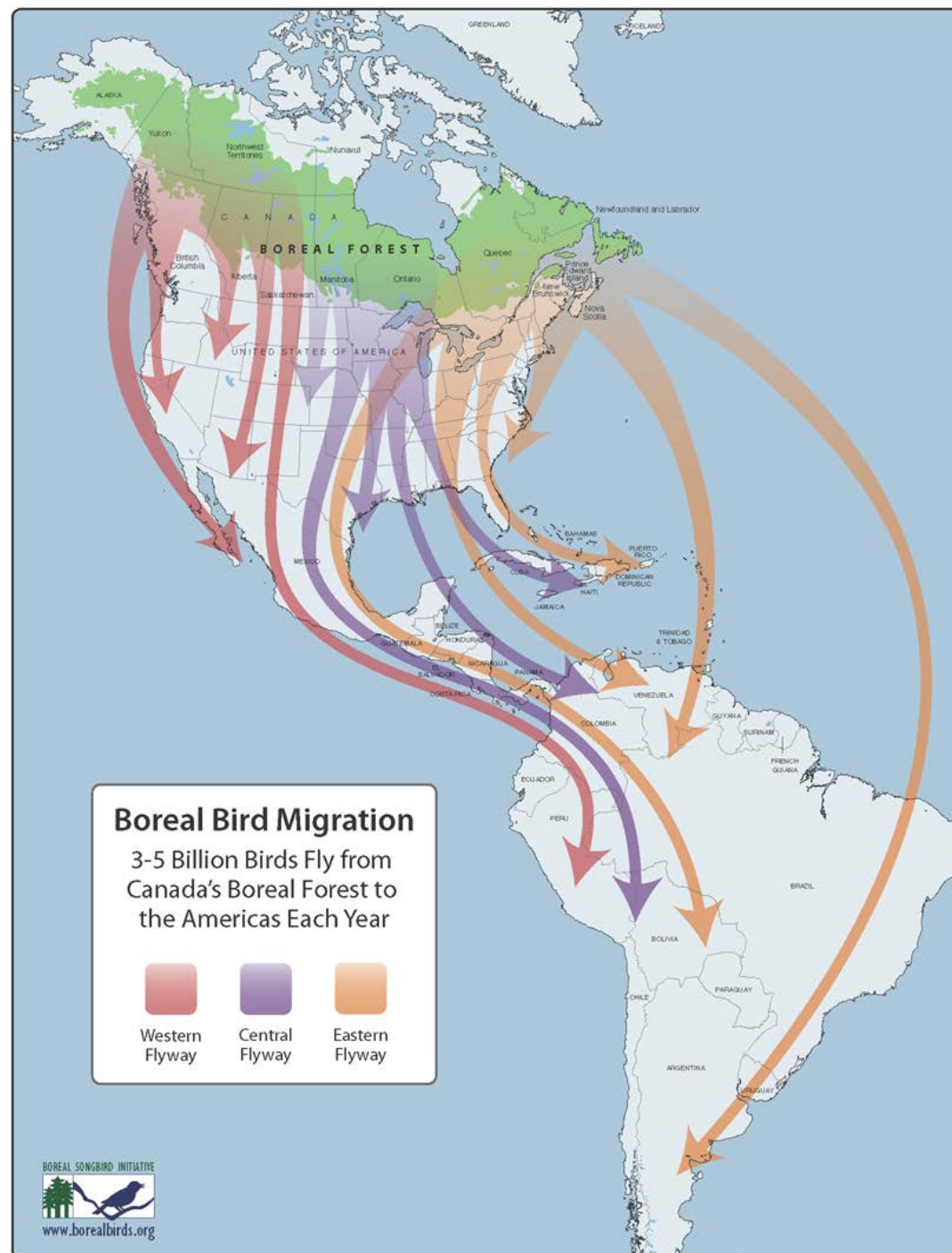


# Major Migratory Flyways

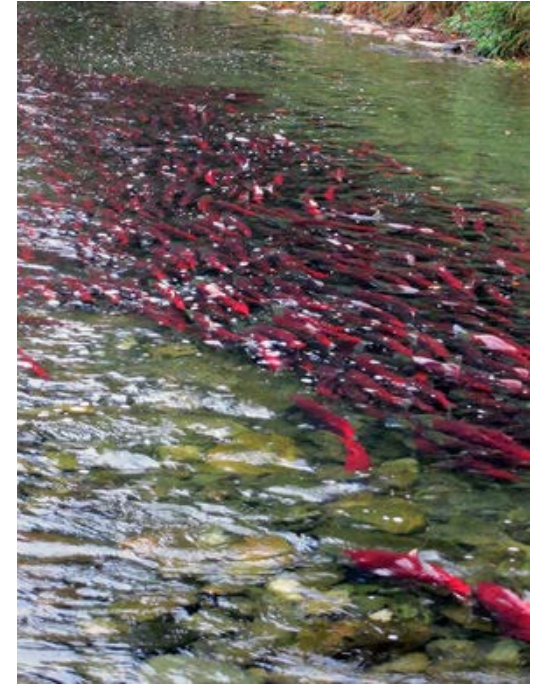
## Waterfowl Flyways





# North American Biannual Migration

- Migratory birds: 50% to tropics, rest to southern U.S. and lower elevations
- Approximately 650 species of birds
- Migrations of large mammals, some bat species, insects, and fish





# Fall Bird Migration

- **Late summer:** fat stored in chest near heart and flight muscles
- **Nocturnal** migrants include thrushes, warblers, orioles, tanagers, and finches – feed during diurnal times
- **Diurnal** migrants include swifts and swallows which feed on air born insects
- **Raptors** – hawks, eagles, vultures, and ospreys – ride **thermals** and winds



# Urge to Migrate Driven By Instinct

- can use sun/stars as reference points-must be able to sense direction and elapsed time
- some sensitive to latitudinal change in magnetic field
- sharp vision and use landmarks such as sea coasts and mountain ranges



# Seasonal Adaptations

- American Redstart
  - Nests in Eastern deciduous forests
  - Winters in lowland tropical forests
- Blackburnian Warbler
  - Nests in boreal spruce forests
  - Winters in mountain cloud forests





# Seasonal Adaptations

- Orioles and Tanagers
  - Insectivores in summer breeding range
  - Nectar eaters in winter range
- Eastern Kingbird
  - Territorial during summer breeding
  - Forms flocks in winter areas





# Advantages of Migrations North for Breeding

1. Less competition
2. Longer daylight hours
  - More feeding time
  - 2-3 clutches can be raised
3. Abundant insects and other arthropods
  - Lots of protein for feeding young
4. Fewer predators – especially nest predators

