PASSIVE RESTORATION OF BIOLOGICAL SOIL CRUSTS

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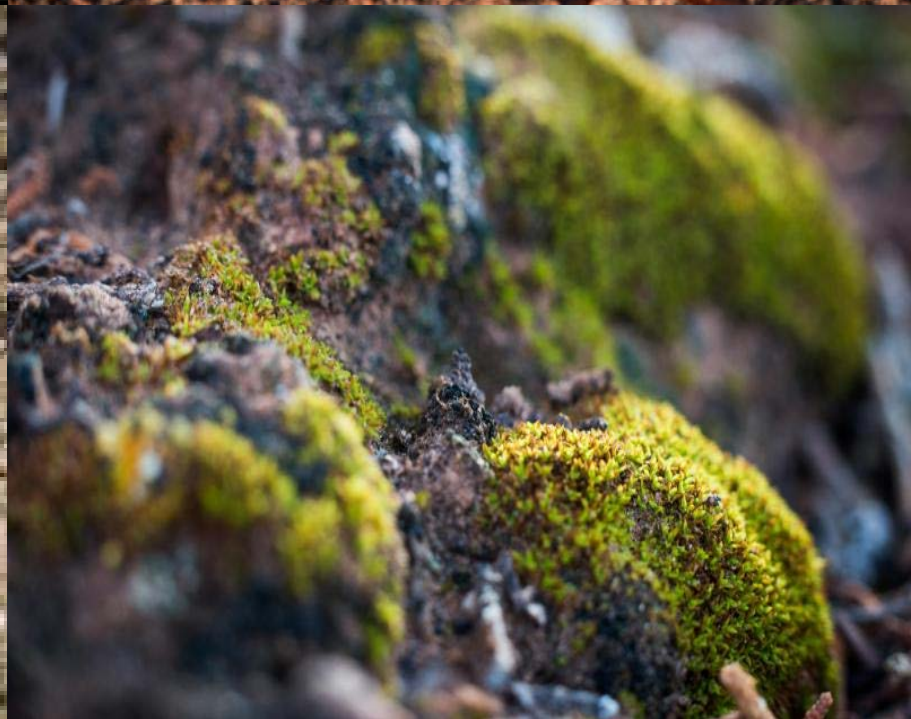
What are Biological Soil Crusts (BSCs)?

- **Consortia of diminutive cyanobacteria, algae, nonlichenized fungi, lichens, and/or bryophytes that occupy the surface and upper few millimeters of the soil**



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- **They are most common in arid and semiarid ecosystems where vascular plant cover and diversity are characteristically low, leaving large areas available for colonization by some combination of the organisms mentioned above**

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- **Soil stability**

How are BSCs affected by anthropogenic disturbance?

- **BSCs, and their ecological functions, can be disturbed by a variety of factors, including, but not limited to:**
  - **Livestock trampling**
  - **Off-road vehicular traffic**
  - **Military training**
  - **Surface mining**
  - **Fire**

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- **So what can be done?**

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- **But how do BSCs become airborne?**


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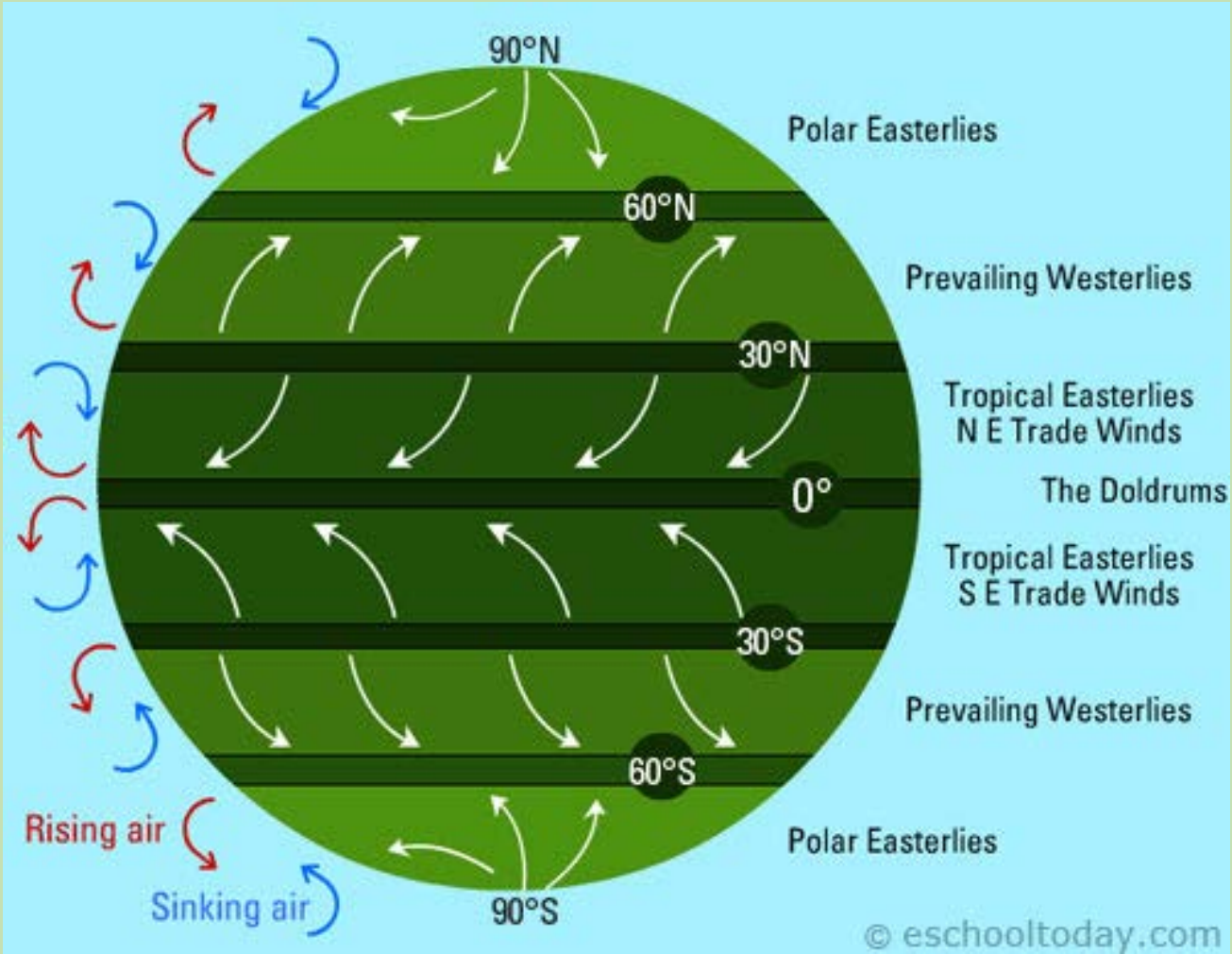
Atmospheric mixing

- **Trade winds – 6 major belts**

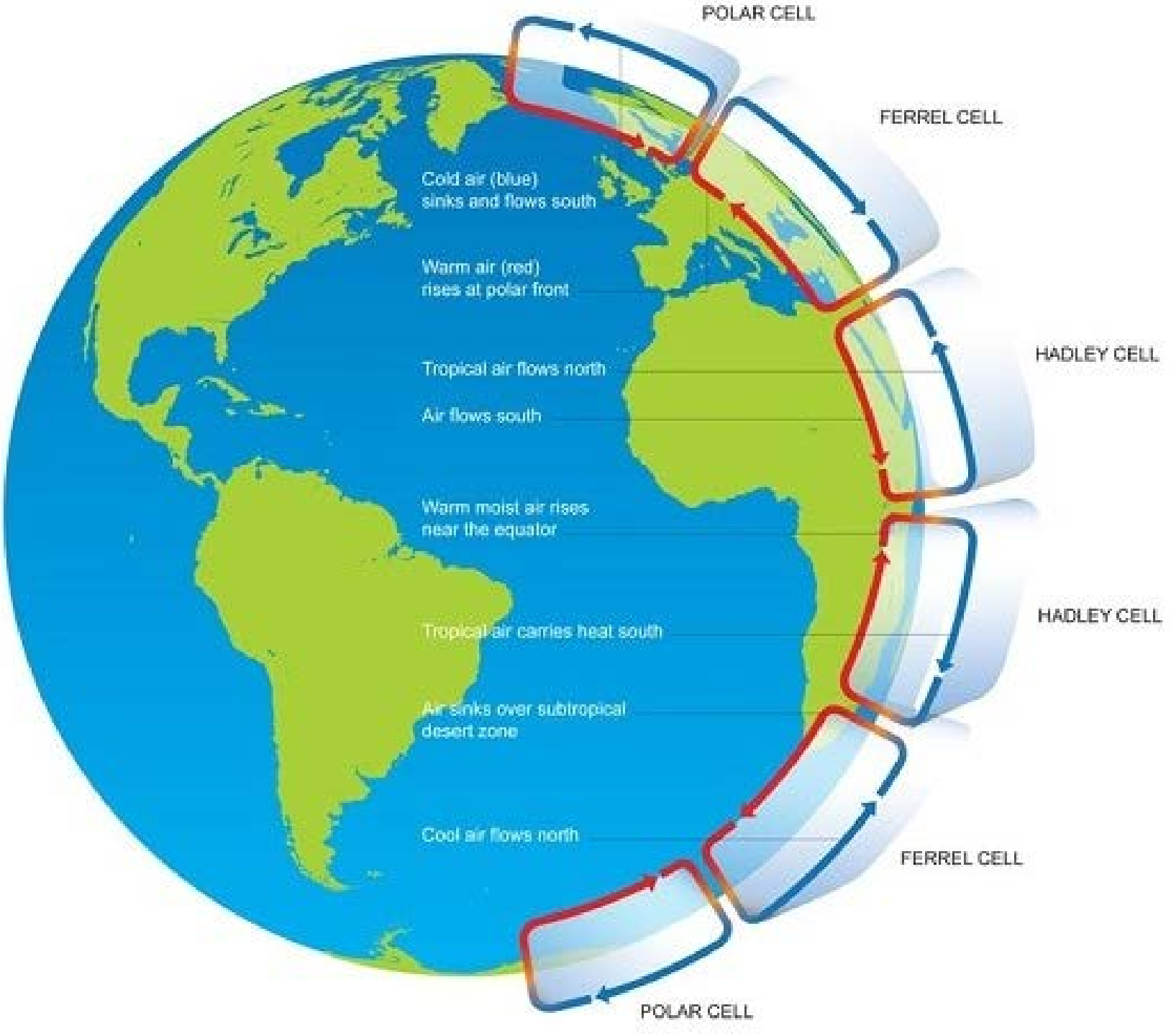


Atmospheric mixing

- Trade winds
- Jet streams
  - Generally west to east
  - 9-15 km above the Earth
  - Can meander between northern and southern hemispheres

Atmospheric mixing

- Trade winds
- Jet streams
- 3-cell system
  - Hadley cells
  - Ferrel cells
  - Polar cells


POLAR CELL
FERREL CELL
Cold air (blue)
sinks and flows south
Warm air (red)
rises at polar front
HADLEY CELL
Tropical air flows north
Air flows south
Warm moist air rises
near the equator
HADLEY CELL
Tropical air carries heat south
Air sinks over subtropical
desert zone
Cool air flows north
FERREL CELL
POLAR CELL

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- **Similarity of BSC communities is better predicted by the so-called 'dust highways' than by proximity**

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4. For greatest ecological benefit, efforts should focus primarily on minimizing the scope and scale of anthropogenic disturbance of BSCs in arid ecosystems
5. **This raises the question as to whether broad-scale artificial restoration merits further consideration; in fact, Mother Nature may already be doing a better job!**