

Decoding the ‘virtual synonymy’ of terms describing spatial and temporal changes in mangrove distribution and extent



Apalachicola Bay
Salt Marsh



Apalachicola Bay
Oyster Reef



Everglades
Sawgrass

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Fauth et al. 1996. "Simplifying the Jargon of Community Ecology: A Conceptual Approach." *The American Naturalist* 147 (2): 282–86.:

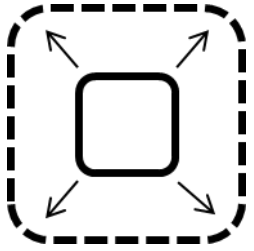
"... imprecise language has led to the **virtual synonymy** of important terms that should retain distinct usages. Clarifying ecological terminology is important not only because it facilitates clear communication but also because it makes explicit the assumptions that underlie concepts and directs attention to those in need of empirical verification."

Synonym: A word having the same or nearly the same meaning as another word

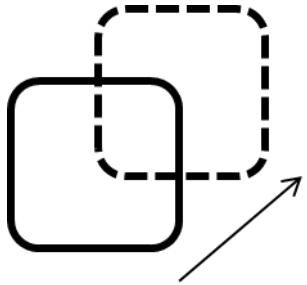
Objectives:

- Do we have a virtual synonymy?
- Compare term usage for assumptions and nuances
- Evaluate potential for miscommunication

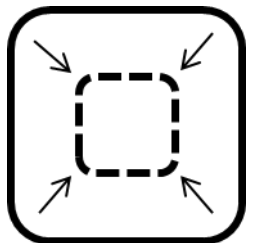
There are numerous terms to describe changes in area occupied by mangroves.



- Alter, change, shift, transform, transition
- Advance, colonize, convert, disperse, displace, dominate, encroach, establish, expand, gain, grow, increase, incursion, infiltration, invade, migrate, mix, occupy, replace, spread, surround, transform, transgress

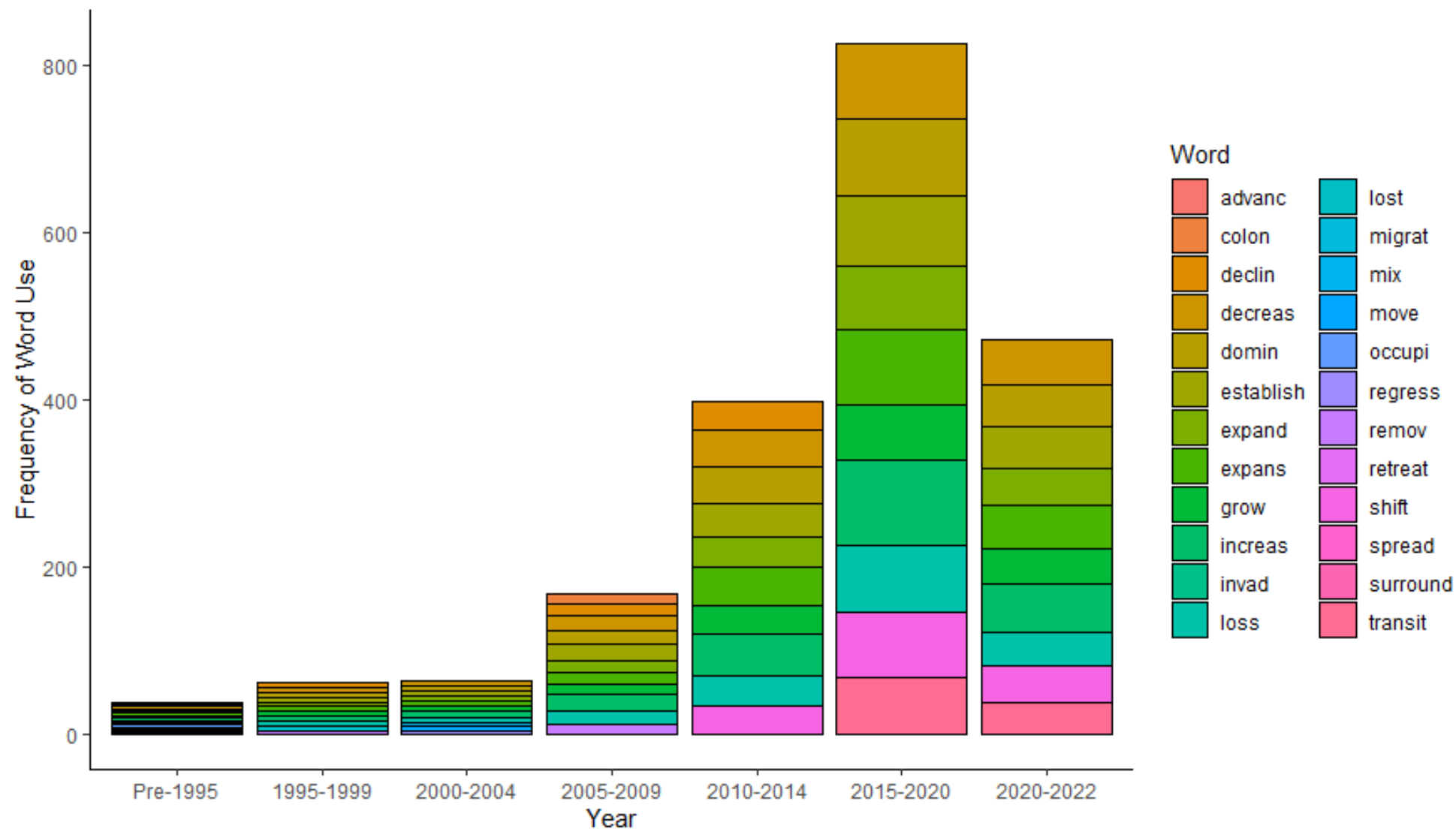


- Migrate, move, regress, shift, transgress

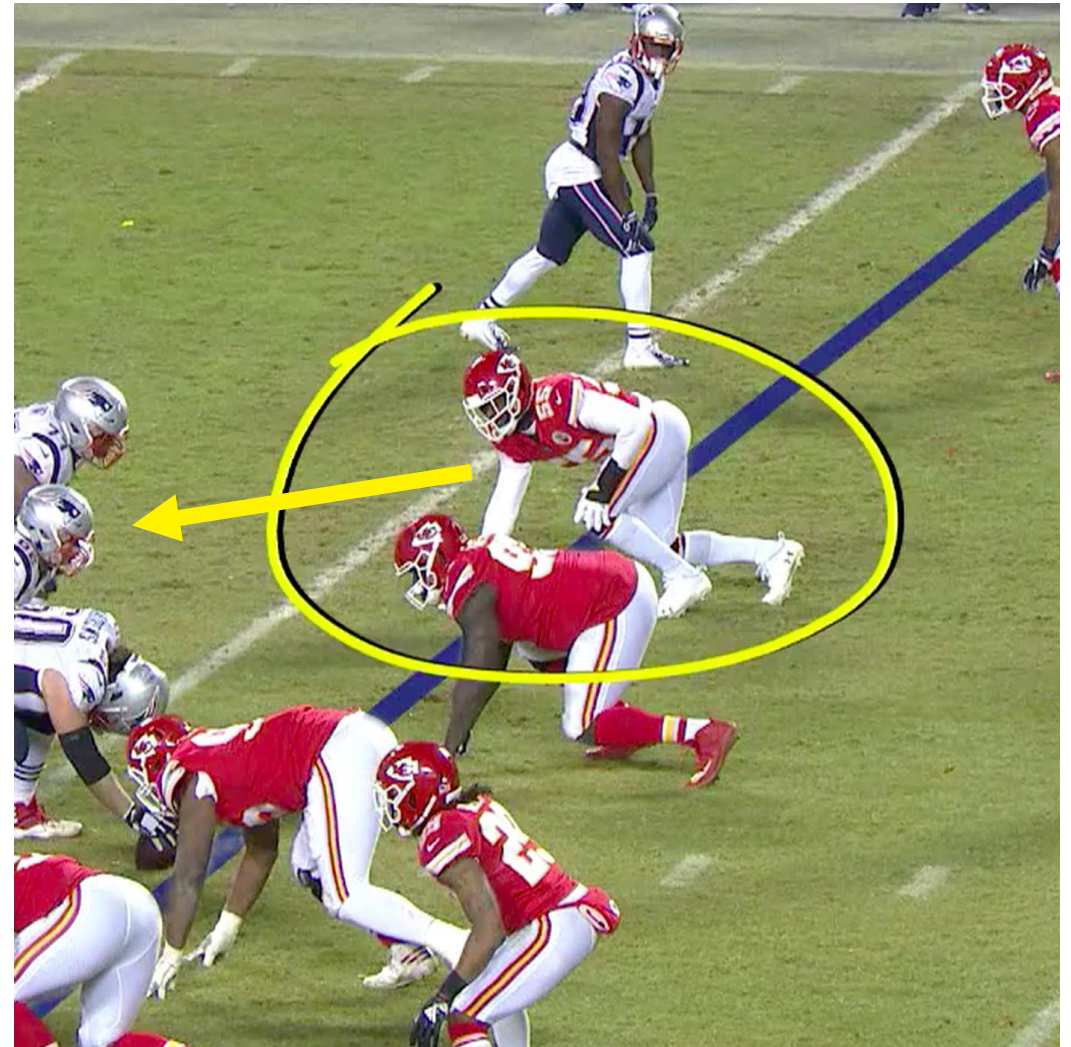
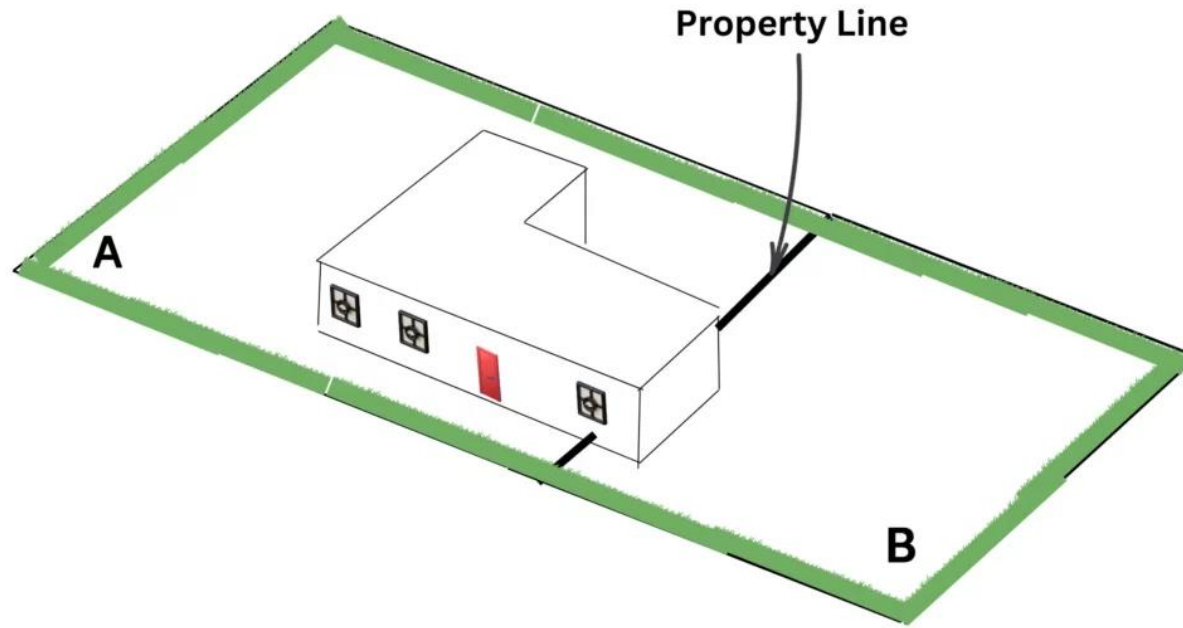


- Contract, decline, decrease, deforest, dieback, loss, regress, remove, retreat

Usage of these terms in mangrove papers has increased in the last 30 years.

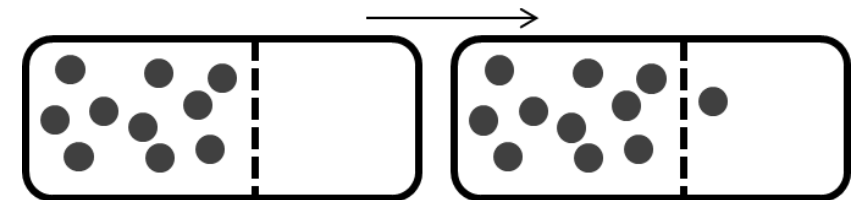
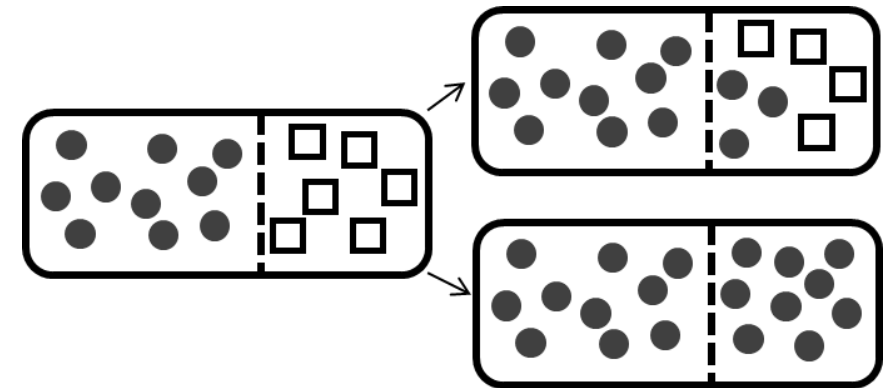
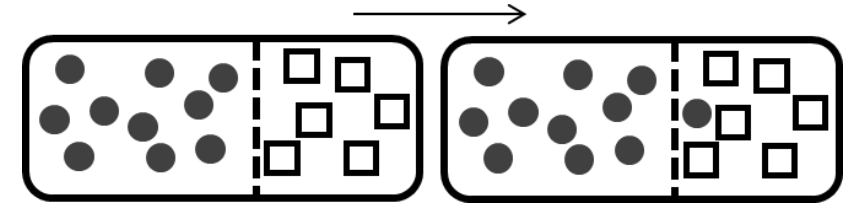


Encroach: Intrude on, advance gradually beyond usual or acceptable limits



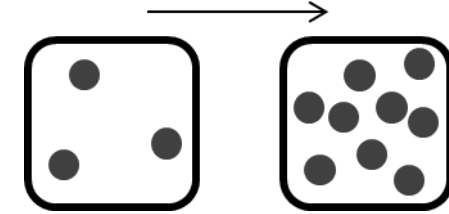
Encroach:

- “Fire is used in the coastal Everglades for... preventing mangrove *encroachment* into marshes....”
- "mangroves had *encroached* into the salt marsh plots“
- "mangrove *encroachment* of salt marshes has contributed to salt marsh **decline**“
- “**replacement** of freshwater marshes by mangrove communities (mangrove *encroachment*)”
- “mangrove *encroachment* across the wetland tract and the absence of salt marsh”

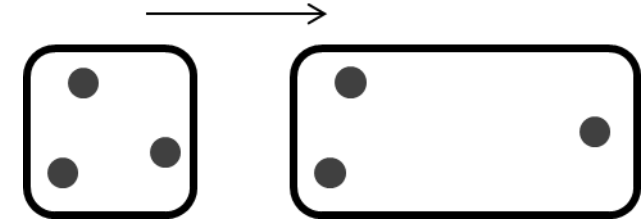


Expand: To become larger or more extensive

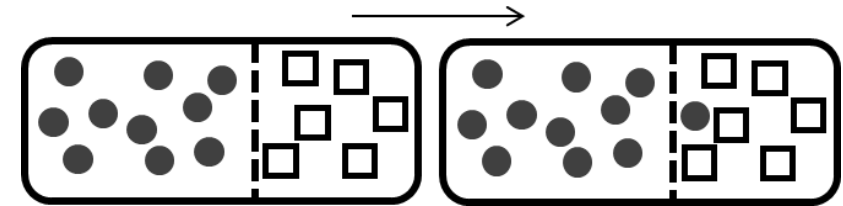
“mangrove expansion... from 96.1 to 106 ha”



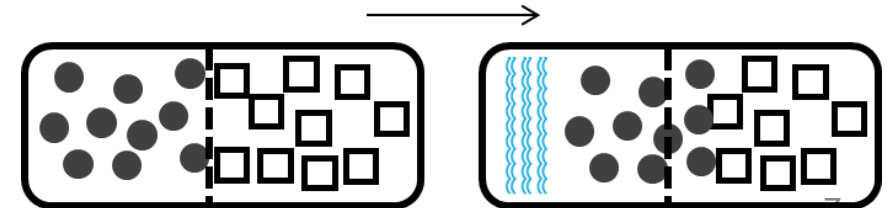
“poleward mangrove forest range expansion”



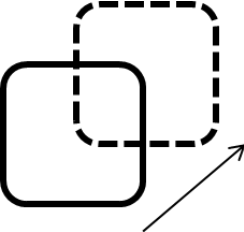
“expansion of mangroves into salt marsh”



“transgression or shifting of mangroves into salt marsh”

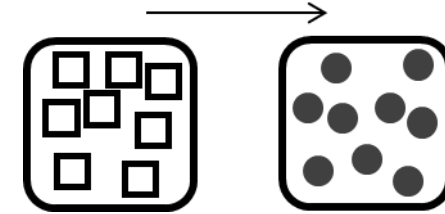


Shift: -move from one place to another, especially over a small distance
-to exchange one thing for another of the same class

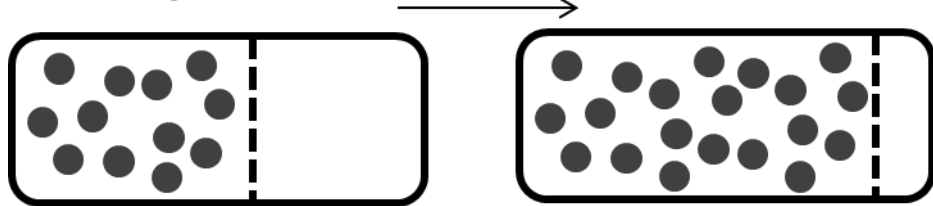
Landward/seaward shift }
~~Range shift~~ ? 

Change?

~~Shift~~ from marsh to mangrove



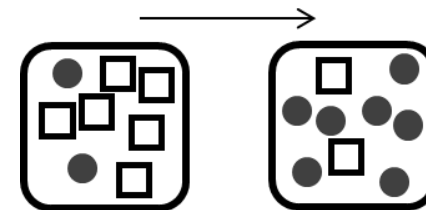
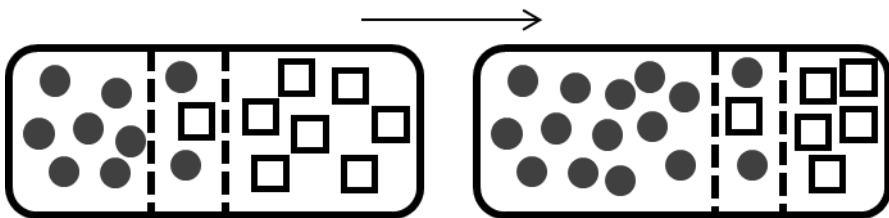
Range limit or boundary shift



Change?

Regime ~~shift~~ (shift in dominance)

Ecotone shift



Colonize:

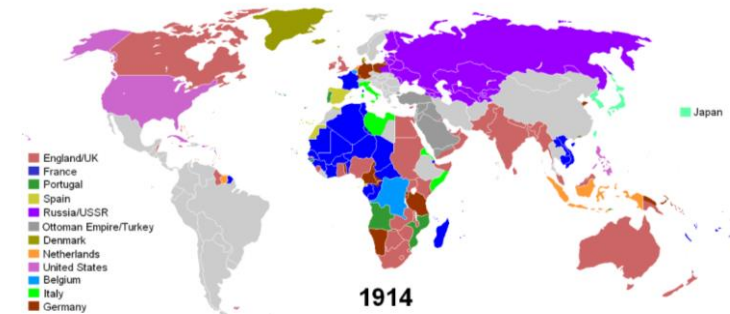
1. appropriate (a place or domain) for one's own use
2. To migrate to and settle in; occupy as a colony.
3. “a dynamic process that begins when unoccupied habitats, territories, or niches become available, or when organisms acquire the ability to survive and reproduce under environmental conditions of new niches, by a process of **adaptation**” -Onofri, S. (2011). doi.org/10.1007/978-3-642-11274-4_144

“A forest with only seedlings and juveniles implies a colonising state”

“the majority of... South Brazil is uncolonizable for mangroves”

“*A. germinans* often colonizes shorelines with *S. alterniflora*”

“*R. mangle* has now colonized all but two of the Hawaiian Islands.”



Invade: 1. enter a region so as to subjugate or occupy it
2. enter a place in **large numbers**, especially with **intrusive** (unwelcome or uninvited) effect.
3. “Invasive species are **non-native (exotic/alien)** to the ecosystem that they occupy, and their existence in that ecosystem causes or is **likely to cause harm** to the economy, environment, or human health.” -- USDA

“A. germinans invades S. alterniflora marsh by propagule dispersal and seedling establishment”

“mangroves have been progressively invading tidal flats.”

“mangroves are invading salt marshes”

In China, an exotic *Spartina alterniflora*... has been invading mangrove wetlands.”

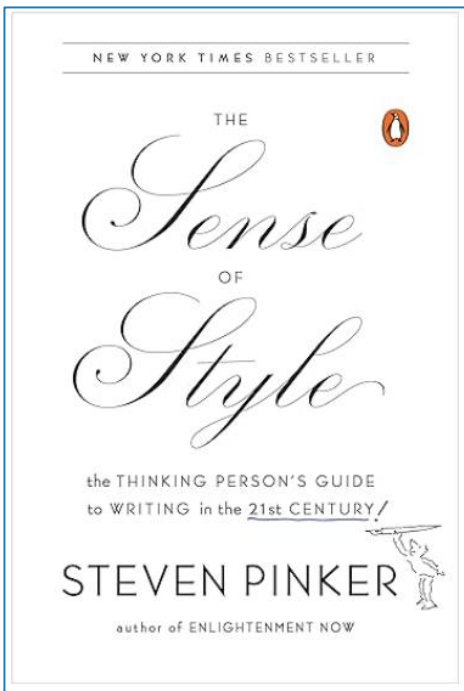
Word-choice has funding implications.

Department of Energy Funding Opportunity Announcement (Fall 2023)

SRA 2: Consequences of Large-scale Shifts in Vegetation Composition

“For this SRA, vegetation shifts are defined as recent (over the past 20 years) changes to vegetation species composition due to loss of previously dominant species, introduction of a previously absent invasive species, change in the relative abundance of the dominant species in a given vegetation community, or change to the dominant vegetation form (*i.e.*, shrub encroachment into grassland or bog) and/or vegetation structure (such as a closed canopy becoming open savannah).

Examples include (but are not limited to): plant species invasions that alter soil carbon storage or ecosystem carbon flux; and impacts of shrub encroachment due to climate drying or fire exclusion on soil nutrient processes”



“Careful writers and discerning readers delight in the profusion of words in the ~~English~~ lexicon, no two of which are exact synonyms.” **Mangrove**
- Steven Pinker, 2014

- Synonymy a potential issue
- Careful wording:
 - Better science
 - Public perceptions
 - AI implications

Questions? Interested?

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