Learning to Live with the Trickster: Resilience Thinking, Climate Change, and Environmental & Natural Resources Law

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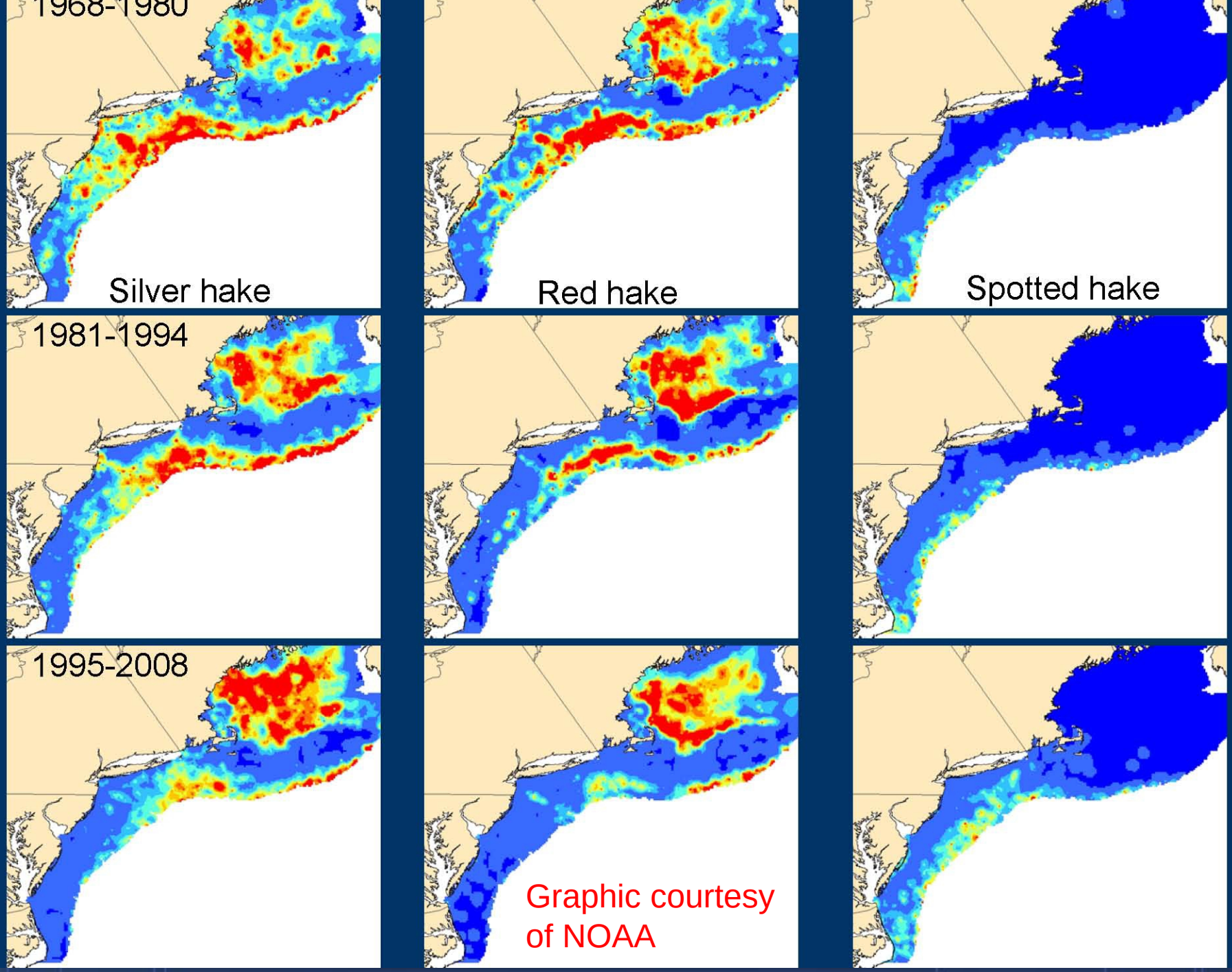
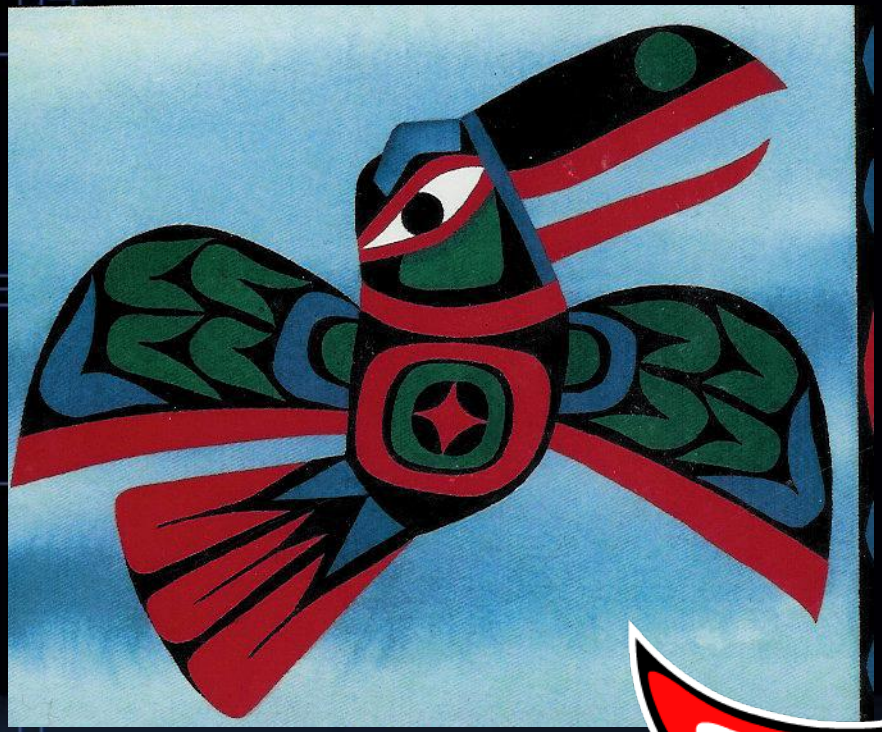
The Question:

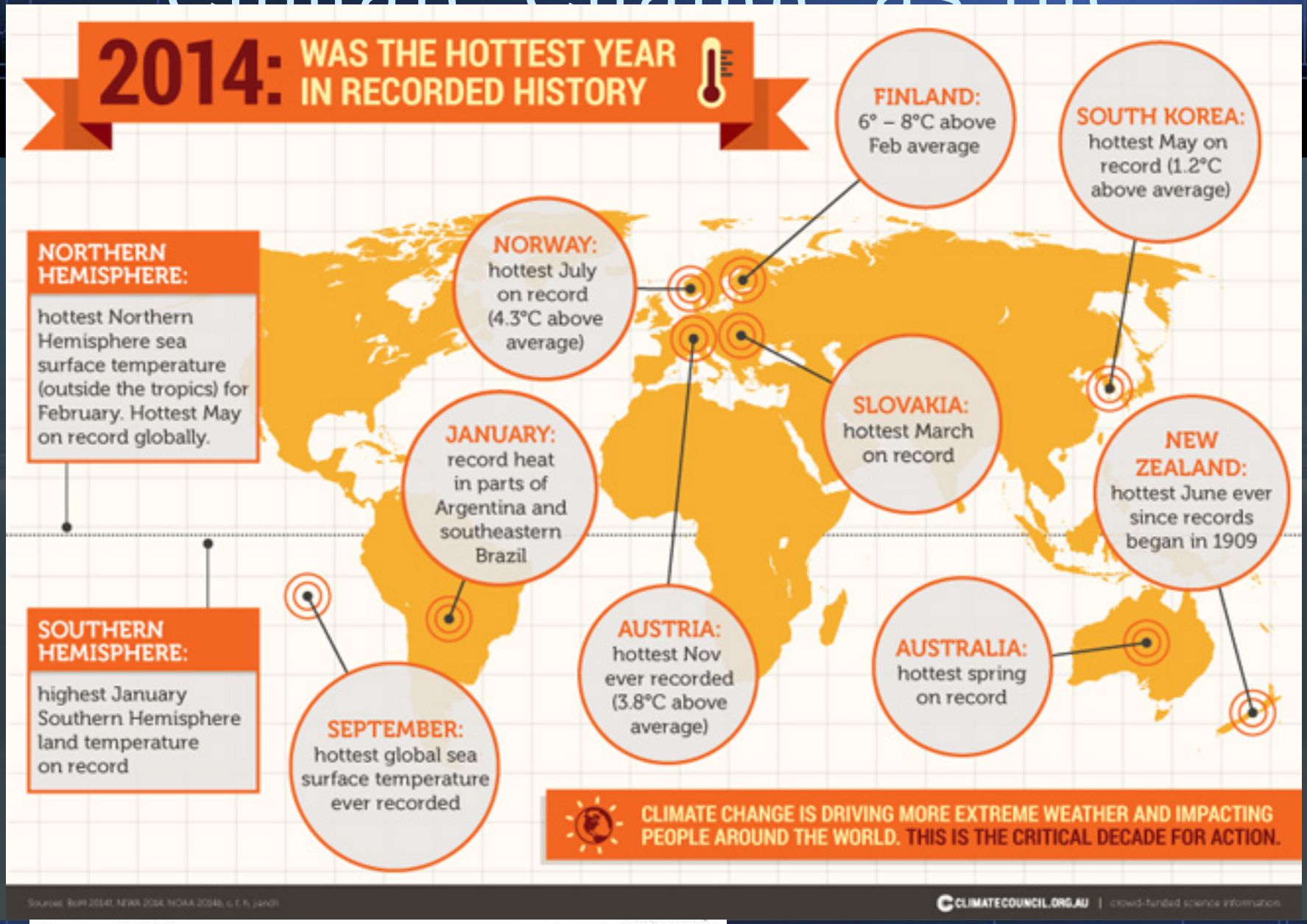
Is "sustainability" the correct framework for natural resources management in a world of increasing, continual, complex, unprecedented, and unpredictable changes to those resources?


1968-1980
Silver hake
Red hake
Spotted hake
1981-1994
1995-2008
Graphic courtesy
of NOAA

Climate Change is the 21st Century American Trickster



Climate Change as the

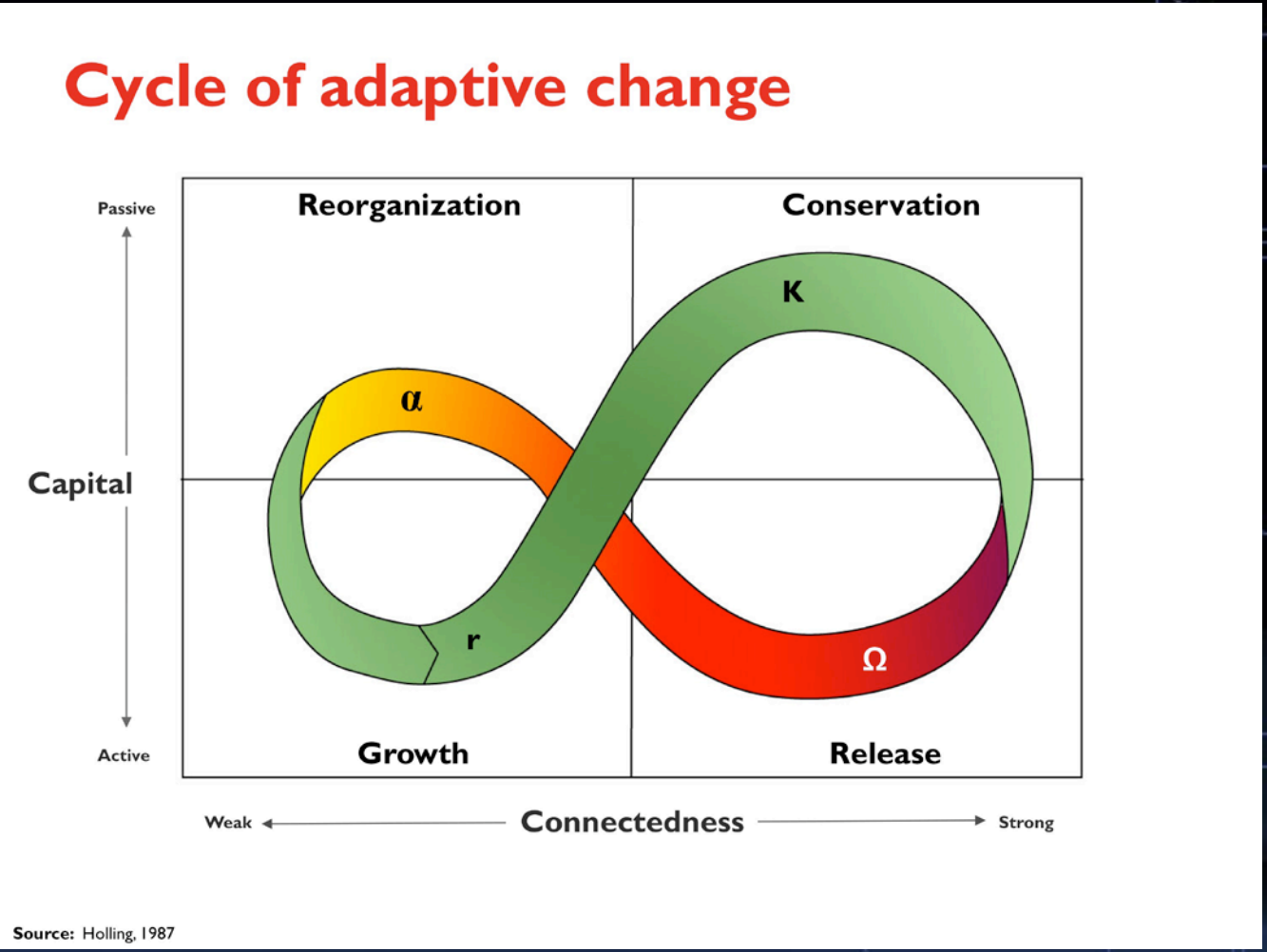


Source: NOAA

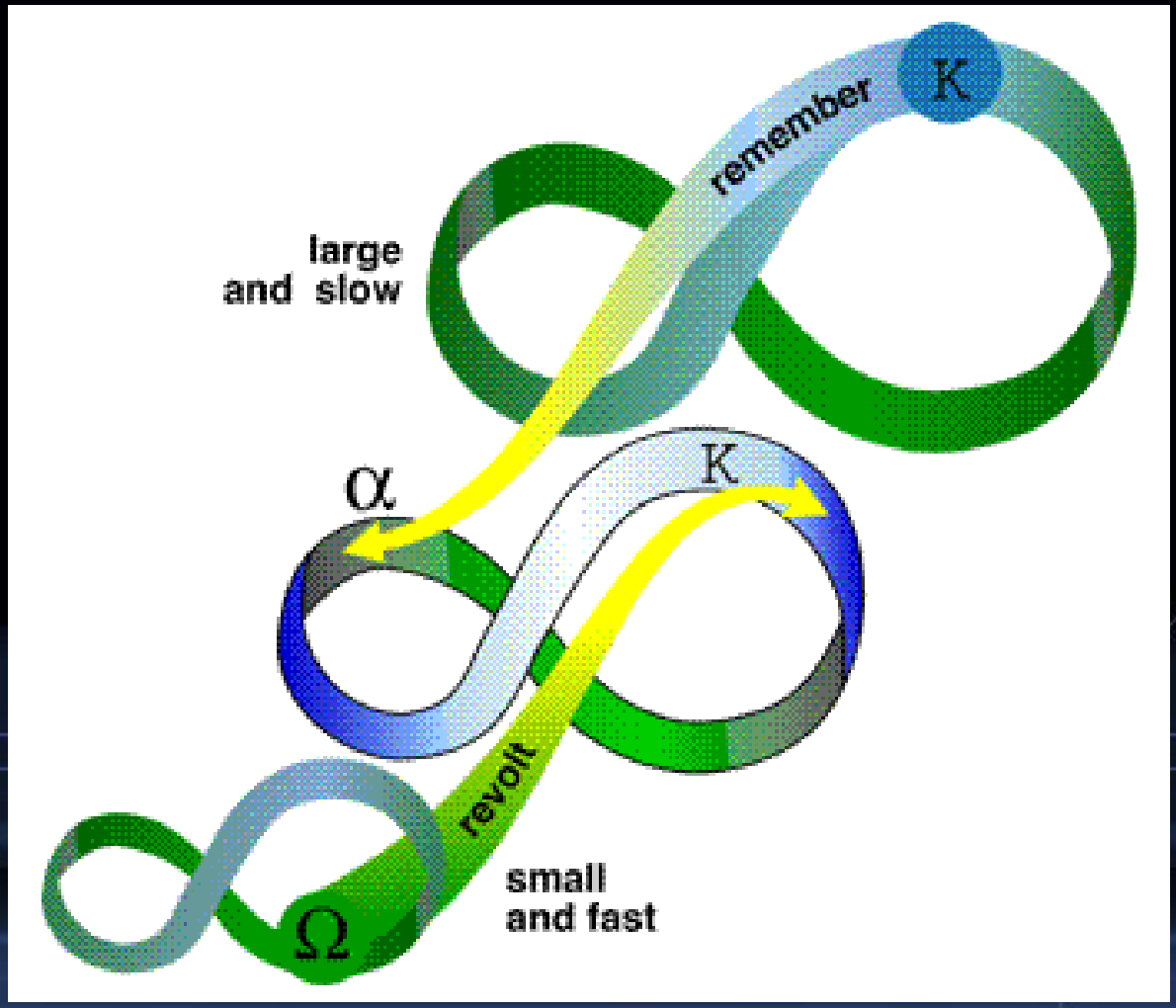
BAY AREA NEWS GROUP

A Better Framework for Changing Times

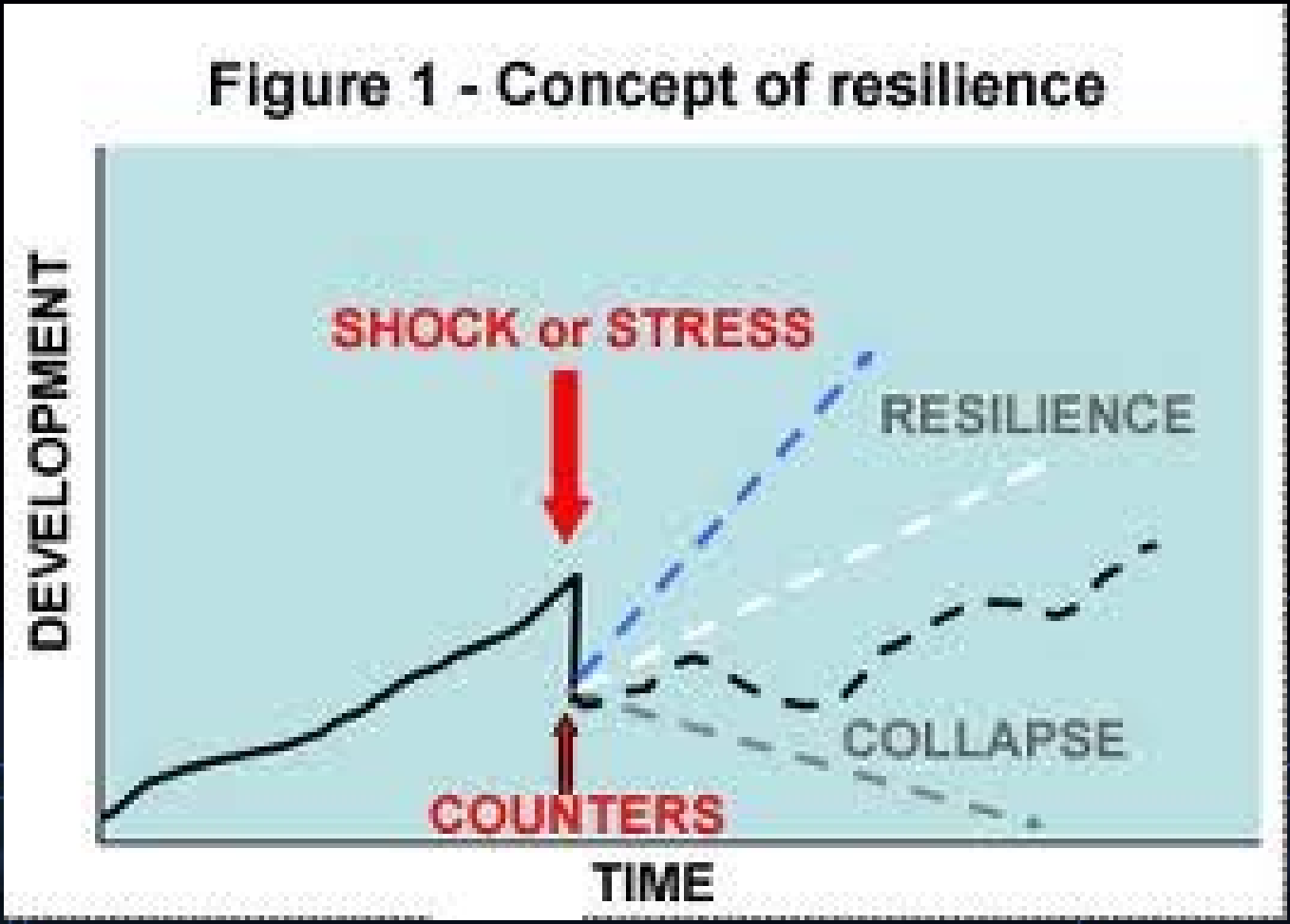
Resilience Thinking



Acknowledging Linked, Complex, & Unpredictable Change



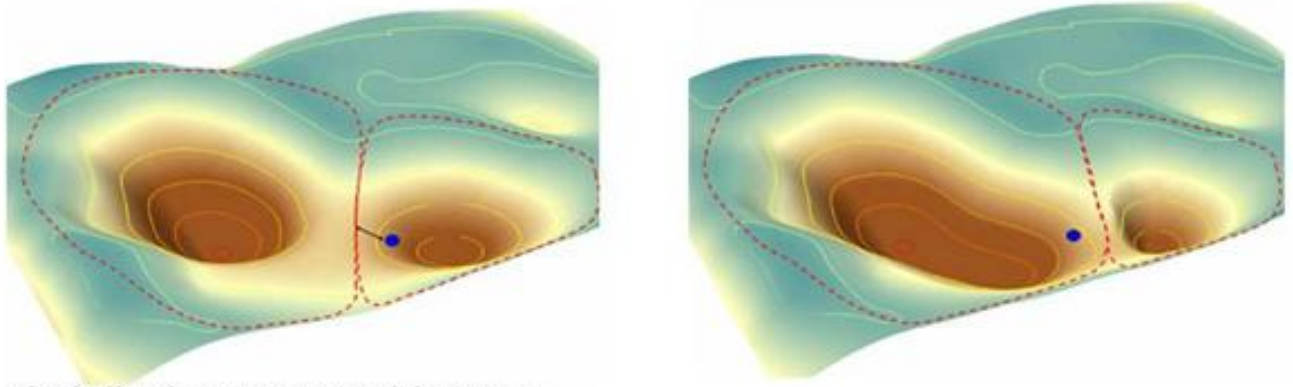
Acknowledging Different Outcomes from Changes



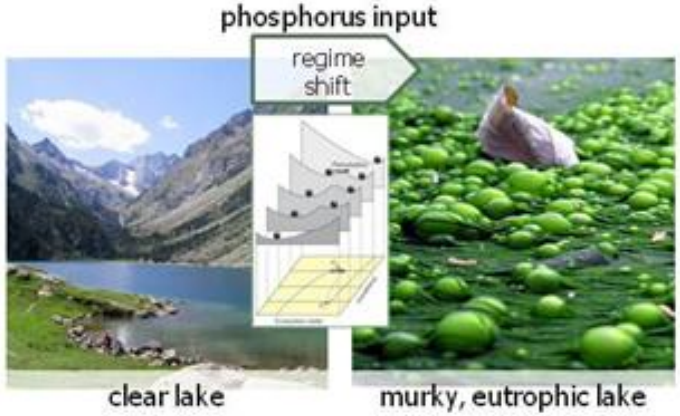
Acknowledging that Transformations are Possible

system dynamics, never at rest:

the ball in the basin, the 'stability landscape'



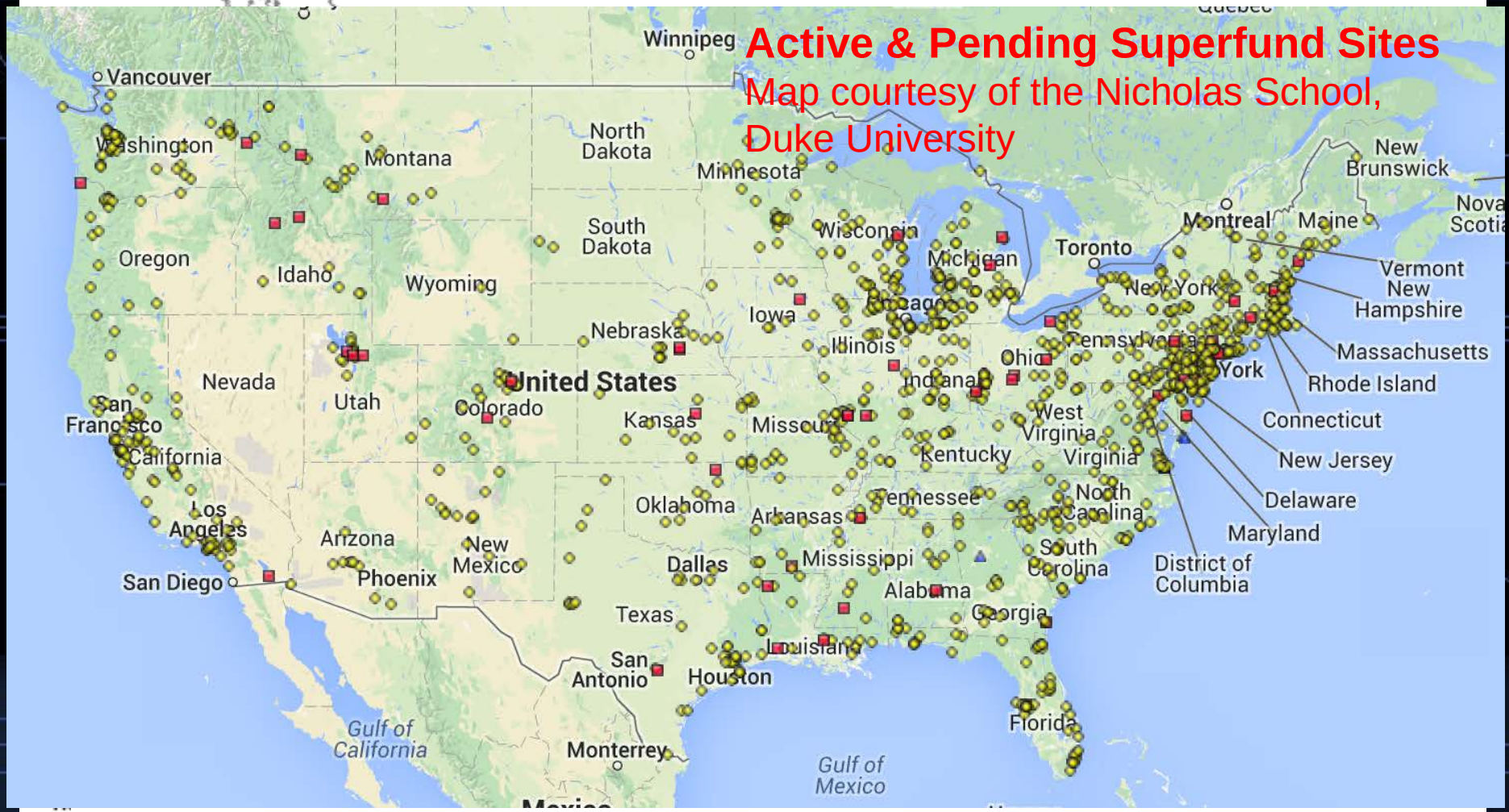
- **the ball** = the current state of the system
- **a basin** = set of states with same functions and feedback (regime); acts as a basin of attraction: the system (= ball) moves to bottom (= equilibrium state, = attractor) but also moves elsewhere because of inner dynamics; multiple regimes
- **shape of basin** is constantly changing due to changing (external) conditions; therefore also position of ball changes: the system is **never in 'stable-perfect' equilibrium**
- **dotted line** = a threshold, after crossing this tipping point, the system tends towards a different equilibrium (because of a change in feedbacks that drive the system's dynamics)



Consequences for Environmental & Natural Resources Law

- Laws that reduce existing stressors on ecosystems are even more important.
- We need a strong precautionary principle.
- We need to increase protections for ecosytems and habitats and open more corridors.
- Population and consumption have to be part of the discussion.

Map of all mercury emissions from power plants in the United States



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Dirty Energy's Assault on our Health: Mercury

Source: U.S. Environmental Protection Agency TRI Explorer: Releases: Trends Reports

Florida Keys
Jamaica
375 ppm
+1°C
450-500 ppm
+2°C
> 500 ppm
>+3°C
2010
2010

Above a 1oC in
often rapidly fo
species. In the 1
board increase
are often subst
very substantia
numbers of exti
major increases

5.1 Impac

Australia:
Kakadu wetlands (9)

Bangladesh:
mangroves and wetlands (8)

Europe:
Mediterranean coast (7)

Europe:
Baltic coast (6)

Europe:
Atlantic coast (5)

USA, Delaware:
floods (4)

USA:
wintering bird habitats (3)

USA:
S. New England wetlands (2)

World:
coastal wetland loss (low) (1b)

World:
coastal wetland loss (high) (1b)

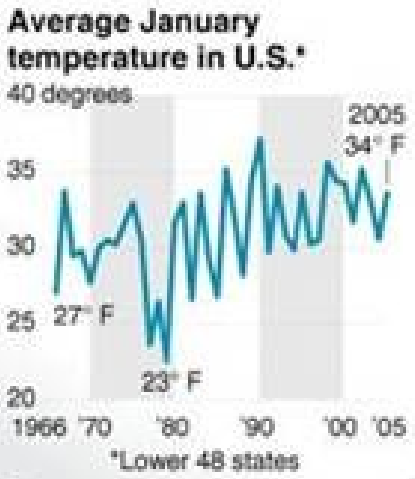
No sign
Small i
Modera
Large l
Severe

Relationship be
temperature an
production, wat
Bill Hare 2005

Spending winter farther north

As the temperature across the U.S. has gotten warmer from 1966 to 2005, many bird species are spending their winters farther north.

Change in winter destination,
20 species with the most movement
Winter 1966-67 **Winter 2005-06**



Marbled Murrelet
Varied Thrush
Pine Siskin
Spruce Grouse
Boreal Chickadee
Red-breasted Nuthatch
Steller's Jay
Pygmy Nuthatch
Red-breasted Merganser
Wild Turkey, 408 miles
Purple Finch, 433 miles
Fox Sparrow
American Goldfinch
House Finch
Virginia Rail
Ring-billed Gull
Ring-necked Duck
American Robin, 206 miles
Rufous-sided Towhee 215 miles
Snow Goose

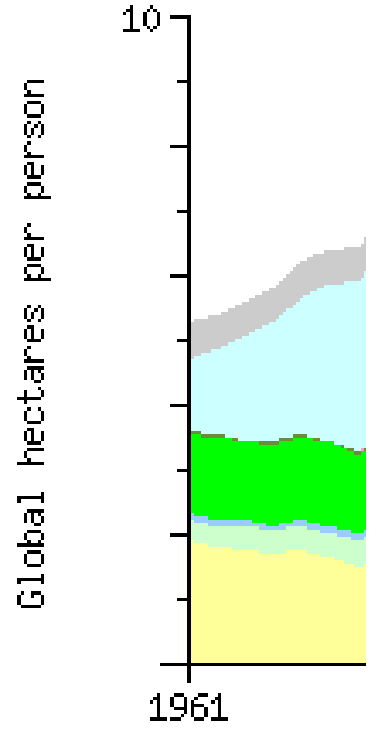
0 200 mi
0 200 km

Sources: Audubon Society; NOAA

The Associated Press

pecies

3°C +4°C



How many planets we'd need if everyone lived like a resident of the following:

Balanced Budget	Global Deficit
USA 5 Planets	
UK 3.4	
Argentina 1.7	
South Africa 1.5	
China 1.0	
India 0.4	
World Average 1.4	

Built Land
CO2 Absorption
Nuclear
Wood Fuel
Timber
Fisheries
Pasture
Cropland

Credit InfoGrafik.com

The Empowerment

- **Resilience thinking warns us that undesirable transformations are possible, and in some cases, maybe, inevitable.**
- **HOWEVER, resilience thinking also teaches us that we can work to avoid the socio-ecological transformations we REALLY don't want.**

And One Last Point . . .

Resilience thinking also counsels us that if we don't get serious about mitigation, the climate change trickster will play a bigger and bigger role in our lives, in ways that make us increasingly uncomfortable.

Trickster Print by Bill Lewis


THANK YOU