

Managing Freshwater Resources to Restore Coastal Ecosystems



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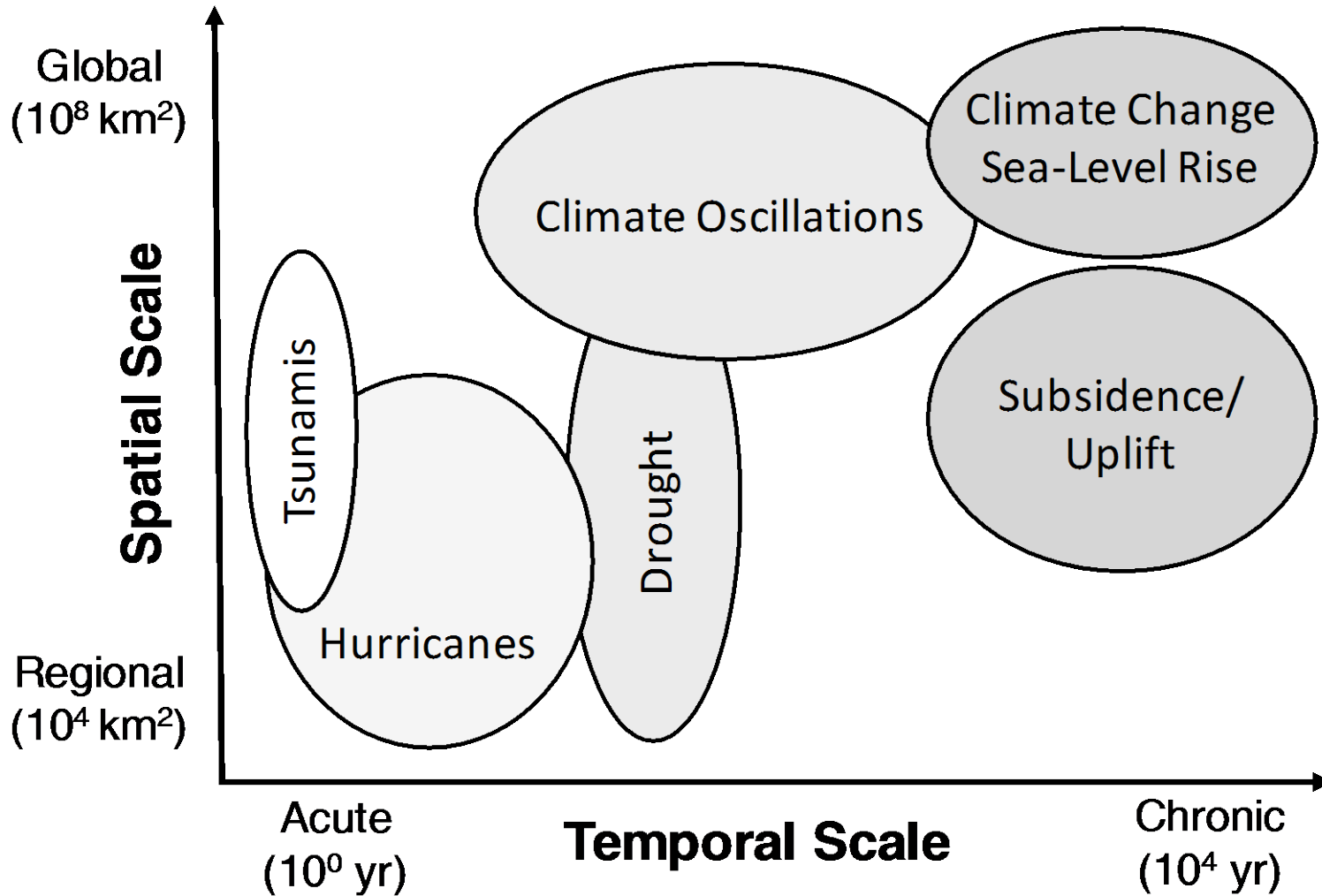
Motivation for this session

Coastal wetlands face myriad environmental ***stressors***:

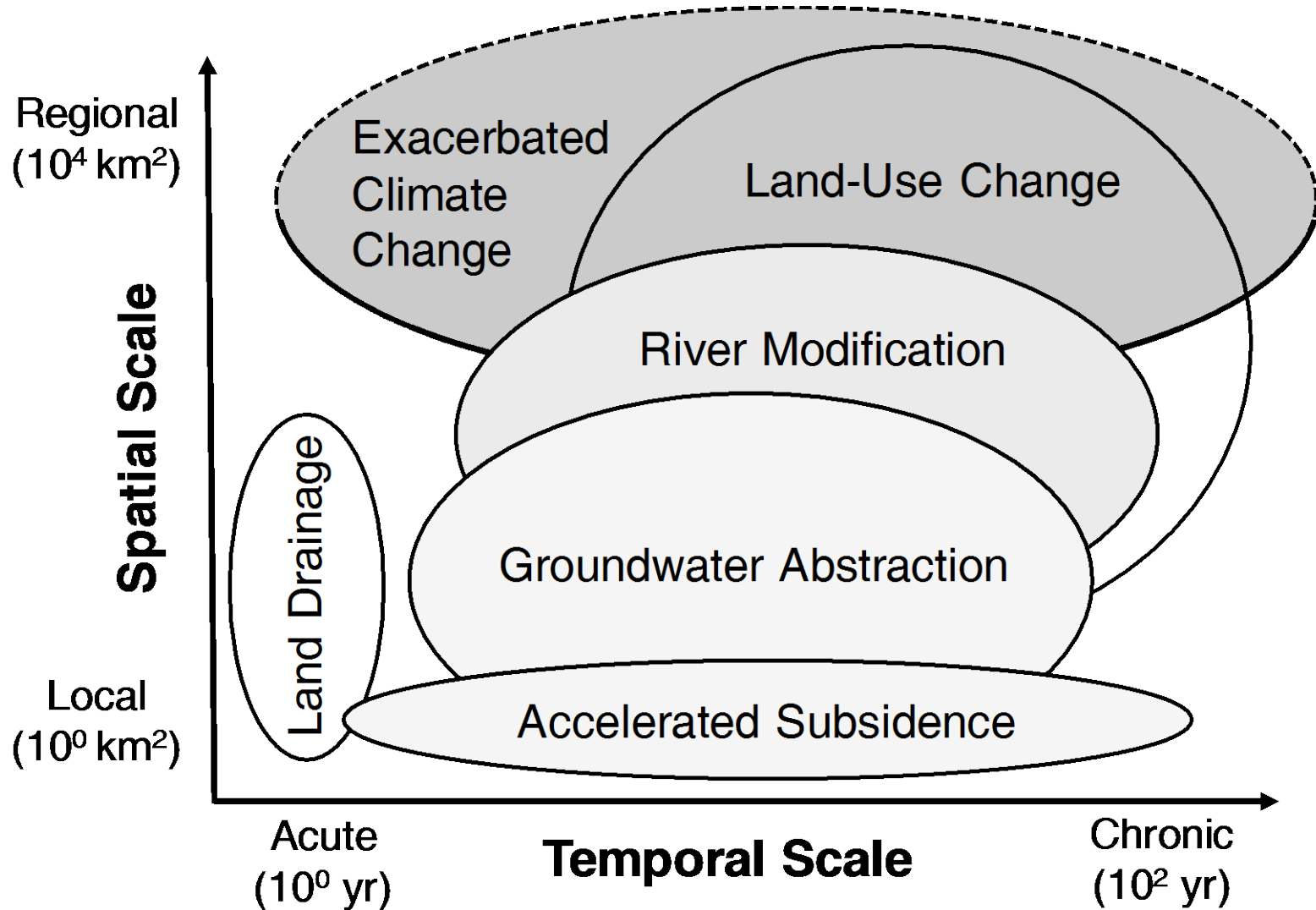
- **Climate Change**: Sea-level rise, changing temp/rainfall regimes
- **Anthropogenic**: Freshwater abstraction (SW+GW), land-use change, watershed and river channel modifications
- **Altered freshwater/saltwater** balance at the coast



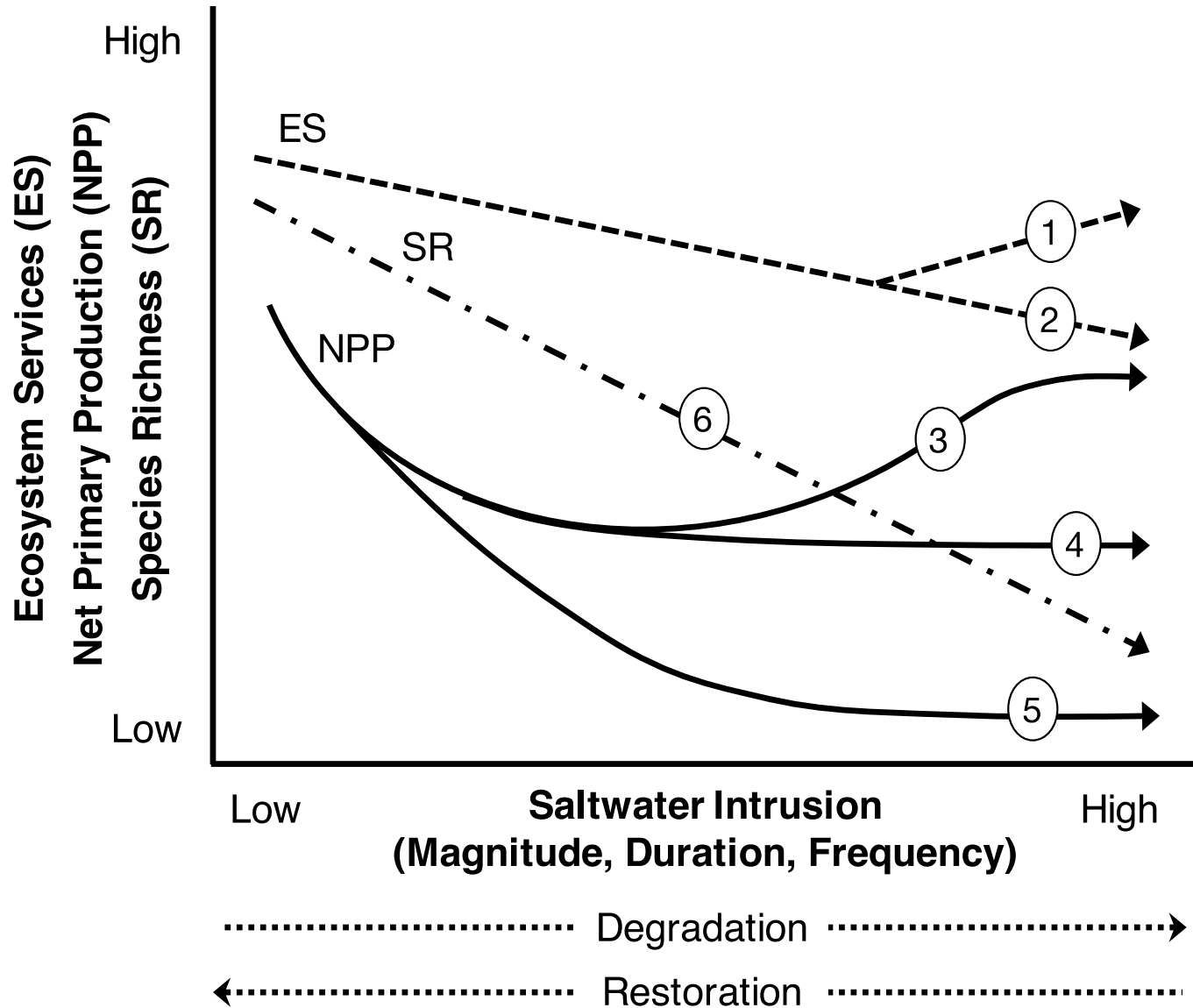
“Natural” Drivers



Anthropogenic Drivers



Ecological Impacts



Motivation for this session

Given these stressors...

(How) should we proactively manage and restore these ecosystems?



Motivation for this session

Water Management Toolbox

- **Modified GW & SW Withdrawals**

- Optimize amounts, locations & timing (Willis & Finney 1998, Dhar & Datta 2009, Singh 2015)
- Conservation (Anderson 2003, Laraus 2004, DeBusk et al. 2102, Lin et al. 2013, Batchelor et al. 2014, Estenoz & Bush 2015, Nelson et al. 2015)

- **Modified GW & SW Delivery**

- Optimize amounts & timing (Morais et al. 2012, Ali 2015, Aumen et al. 2015, Kaplan et al. 2015, Low et al. 2015)
- Enhance recharge (Arlai et al. 2006, Dillon et al. 2009, Werner et al. 2013, Asano 2013, Maliva 2014, Zekri et al. 2015)
- FW resource development (SFWMD 2006, Bloetscher et al. 2011, McLaughlin et al. 2013)
- Engineered structures (Day et al. 2005, Cui et al. 2009, Allison & Meselhe 2010, Paola et al. 2011, Kemp et al. 2014, Miloshis & Fairfield 2015)

- **Pray for Rain** (Perdue 2007) **or no Rain**

