

Table S1: List of Exposure Factors, Biological attributes and Non-climatic Stressors using in assessing the vulnerability of the *C. tulipa* to climate change modified after [From 45].

Climatic Factor/Biological Attribute	Goal	Low Score	High Score
Climatic Factors			
Mean Air Temperature	To determine if there are changes in mean air temperature by comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Mean Precipitation	To determine if there are changes in mean precipitation comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Mean Estuarine Temperature	To determine if there are changes in mean estuarine temperature comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Mean Estuarine pH	To determine if there are changes in mean estuarine pH comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Mean Estuarine Salinity	To determine if there are changes in mean Air temperature comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Mean Surface Runoff	To determine if there are changes in mean surface run-off comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Mean River Flow	To determine if there are changes in mean river flow comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Variability in Air Temperature	To determine if there are changes in variability of air temperature comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Variability in Estuarine Temperature	To determine if there are changes in estuarine temperature variability comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Variability in Precipitation	To determine if there are changes in precipitation variability comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Variability in Estuarine Salinity	To determine if there are changes in estuarine salinity variability comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Variability in Estuarine pH	To determine if there are changes in estuarine pH variability comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change

Variability in Surface Run-off	To determine if there are changes in surface run-off variability comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Variability in River Flow	To determine if there are changes in surface run-off variability comparing the 1986–2005 to 2006–2055 periods	Low magnitude of change	High magnitude of Change
Sea Level Rise	To evaluate the magnitude of sea level, rise relative to the ability of nearshore habitats to change	Low magnitude of change	High magnitude of Change
Estuarine Currents	To evaluate changes in large-scale circulation.	Low magnitude of change	High magnitude of Change
Ocean Acidification	To determine if there are changes in ocean pH (global) by comparing 1986-2005 to 2006-2055	Low magnitude of change	High magnitude of Change
Ocean Acidification	To determine if there are changes in ocean alkalinity (global) by comparing 1986-2005 to 2006-2055	Low magnitude of Change	High magnitude of Change
Ocean Acidification	To determine if there are changes in ocean dissolved inorganic carbon (DIC) (global) by comparing 1986-2005 to 2006-2055	Low magnitude of Change	High magnitude of Change
Biological Attributes			
Prey Specificity	To determine, on a relative scale, if the stock is a prey generalist or a prey specialist	Prey Generalist	Prey Specialist
Habitat specificity	To determine, on a relative scale, if the stock is a habitat generalist or a habitat specialist while incorporating information on the type and abundance of key habitats	Habitat Generalist	Habitat Specialist
Sensitivity to Ocean Acidification	To estimate the stock's sensitivity to ocean acidification	Sensitive Taxa	Insensitive Taxa
Complexity in Reproduction strategy	To determine how complex the stock's reproductive strategy is and how dependent reproductive success is on specific environmental conditions	Low Complexity: Broadcast Spawning	High complexity: Aggregate Spawning
Sensitivity to Temperature	To use the distribution of the species as proxy for its sensitivity to temperature.	Broad thermal limits	Narrow thermal limits
Early Life History Survival and Settlement Requirement	To determine the relative importance of early life history requirements of the stock	Generalist with few requirements	Specialist with specific requirements
Stock Size Status	To estimate stock status to clarify how much stress from fishing the stock is experiencing and to determine if the stock's resilience or adaptive capacity are compromised due to its abundance	High Abundance	Low Abundance
Other Stressors-pollution	To account for conditions that could increase the stress on the stock and thus decrease its ability to respond to changes.	Low Level of Stressors	High Level of Stressors

Population Growth Rate	To estimate the relative productivity of the stock	High Population Growth	Low Population Growth
Dispersal of Early Life Stages	To estimate the ability of the stock to colonize new habitats when or if their current habitat becomes less suitable	High Dispersal	Low Dispersal
Adult Mobility	To estimate the ability of the stock to move to a new location if their current location changes and is no longer favorable for growth and/or survival	High Mobility	Low Mobility
Spawning	To determine if the duration of the spawning cycle for the stock could limit the ability of the stock to successfully reproduce, if necessary, conditions are disrupted by climate change	Year-round	One-event per Year.