

# THE IMPACT OF CLIMATE CHANGE ON ABALONE: WHAT CAN WE DO?

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## BACKGROUND

- Climate change has made ecosystems increasingly uninhabitable for marine animals
- Abalone were integral to their ecosystem and the commercial and recreational fishing industry however due to climate change the population in California has drastically decreased
- In order to conserve abalone, we need to understand the effects of climate change, which is addressed by my research question:

## RESEARCH QUESTION

What is the impact of climate change on abalone in California?

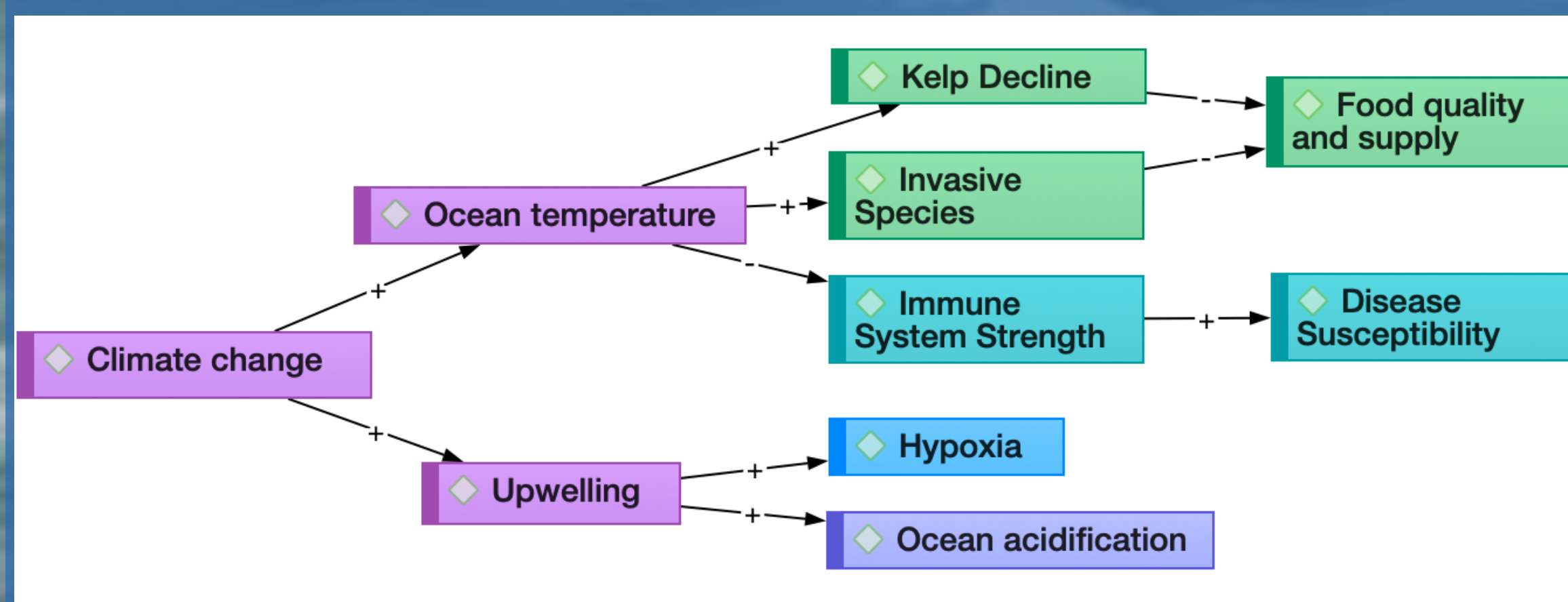


Figure 1: Flow chart showing the factors of climate change that change the environment of abalone and threaten their survival and health

## INTERNSHIP & METHODS

- Internship at NOAA Fisheries on the status of pink and green abalone
- Conducted interviews and literature reviews and analyzed interview data using ATLAS.ti

## RESULTS

### Disease and Mortality

- Immune systems are compromised as abalone divert energy to maintain their physiology
- Higher temperatures promote the growth of pathogens and increase susceptibility to diseases such as Withering Syndrome which is fatal for abalone

### Decreased Growth and Reproduction

- Loss of kelp reduces the food supply which decreases the number of abalone eggs and sperm, and decreases gonad condition
- Sperm count is more susceptible to higher temperatures than the number of eggs
- Abalone shell sizes are reducing

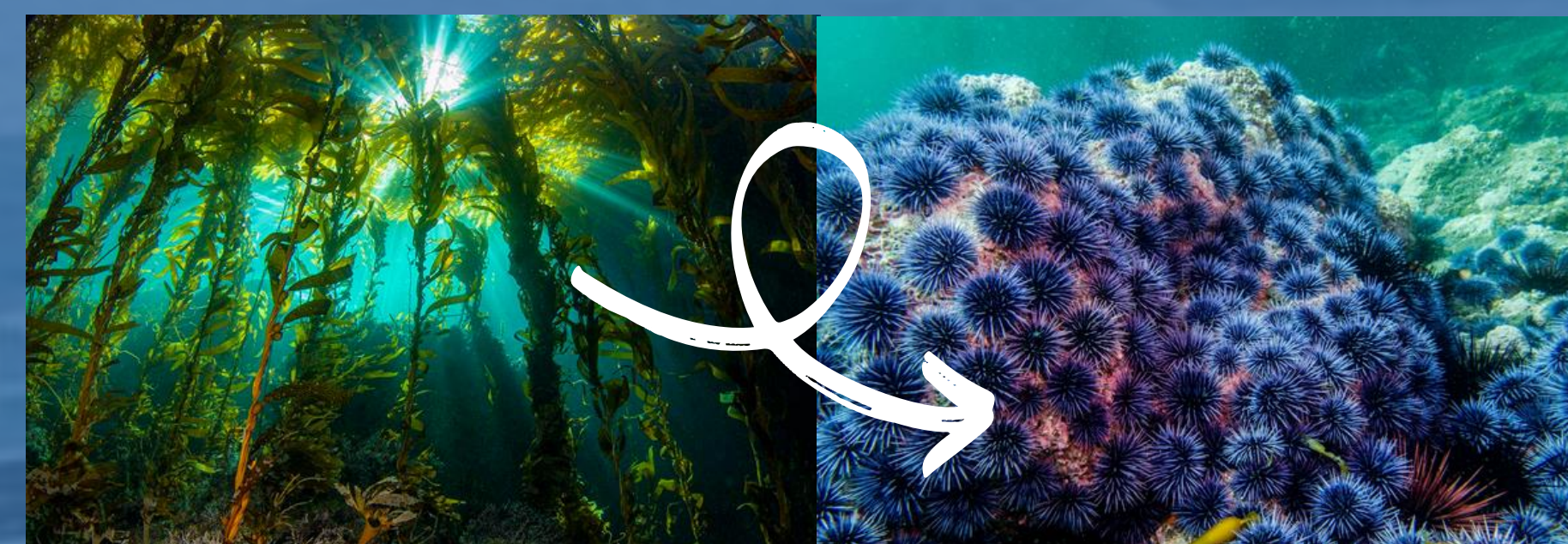


Figure 2: Kelp forests (left) which abalone depend on for their food, were largely replaced by urchin barrens (right) by 2016 - 2018. Source: Douglas Klug and Katie Davis

### Resilience to Climate Change

- Red abalone are more vulnerable to temperature change than green abalone
- Age influences an abalone's vulnerability

"Ocean acidification is very subtle it is not really thought to kill adult abalone, but it might cause greater mortality for larvae."  
~Interview with Charles Boch



Figure 3: Green abalone (left) and red abalone (right) Source: NOAA Fisheries and Derana171

"When you look at climate change and ocean conditions, what we see is temperature, dissolved oxygen and pH all varying together." ~Interview with Charles Boch

## SIGNIFICANCE

- **Education** on climate change and its impact on biodiversity will create more awareness and encourage conservation efforts
- **Research and monitoring** of abalone helps track their status and conditions
- **Population restoration** efforts:
  - Habitat mapping
  - Marine microclimates
  - Captive breeding

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