

# North American Coasts under a Climate Change Context

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**Mexico**

# COASTAL ZONES AND CLIMATE CHANGE

# BACKGROUND



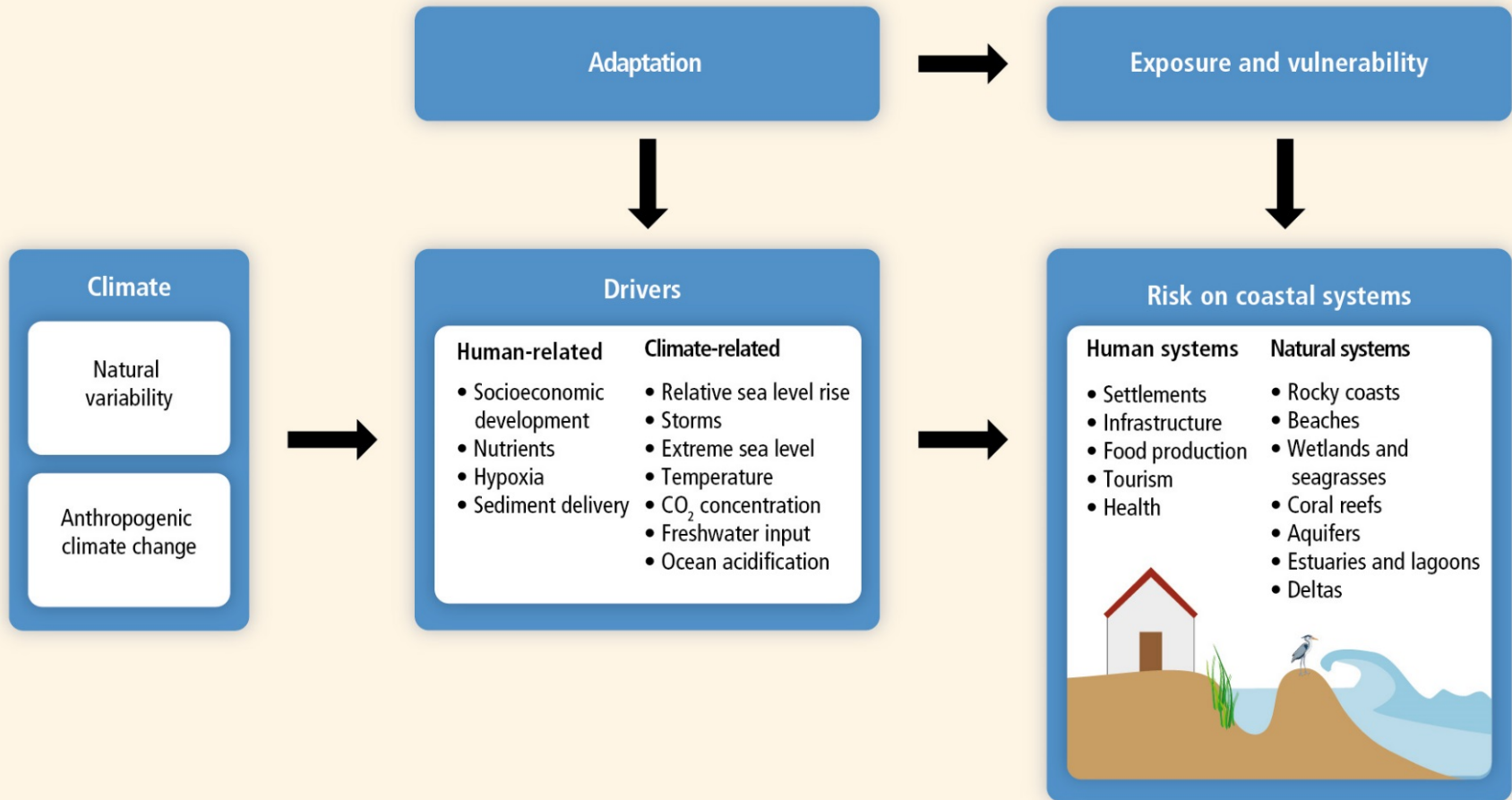
United Nations Conference on Environment and Development (UNCED, 1992)



Adverse Effects of Climate Change (IPCC, 2014)

1. Sea Level Rise
2. Subsidence
3. Coastal Erosion
4. Floods
5. Redistribution of Marine Species
6. Reduction of Biodiversity in Sensitive Regions
7. Effects in Fisheries and other Ecosystem Services

# ADAPTATION IN COASTAL ZONES



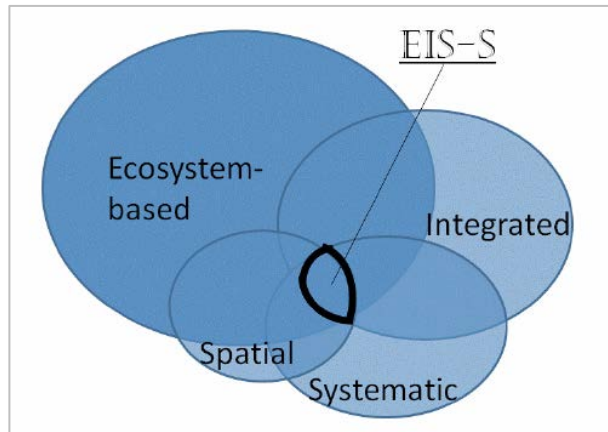
SOURCE: WONG et al. (2014, p.367)

## MEAN SEA LEVEL RISE (2200-2500)

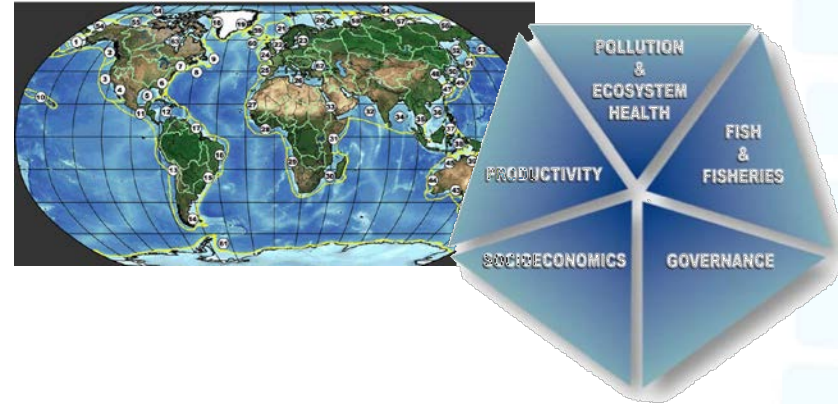
Emission scenario	Mean sea level rise (m)		
	2200	2300	2500
Low	0.35–0.72	0.41–0.85	0.50–1.02
Medium	0.26–1.09	0.27–1.51	0.18–2.32
High	0.58–2.03	0.92–3.59	1.51–6.63

SOURCE: WONG et al. (2014, p.369)

## MARINE SPATIAL PLANNING (Ehler y Douvère, 2009)



## LARGE MARINE ECOSYSTEMS (Sherman, 1996)

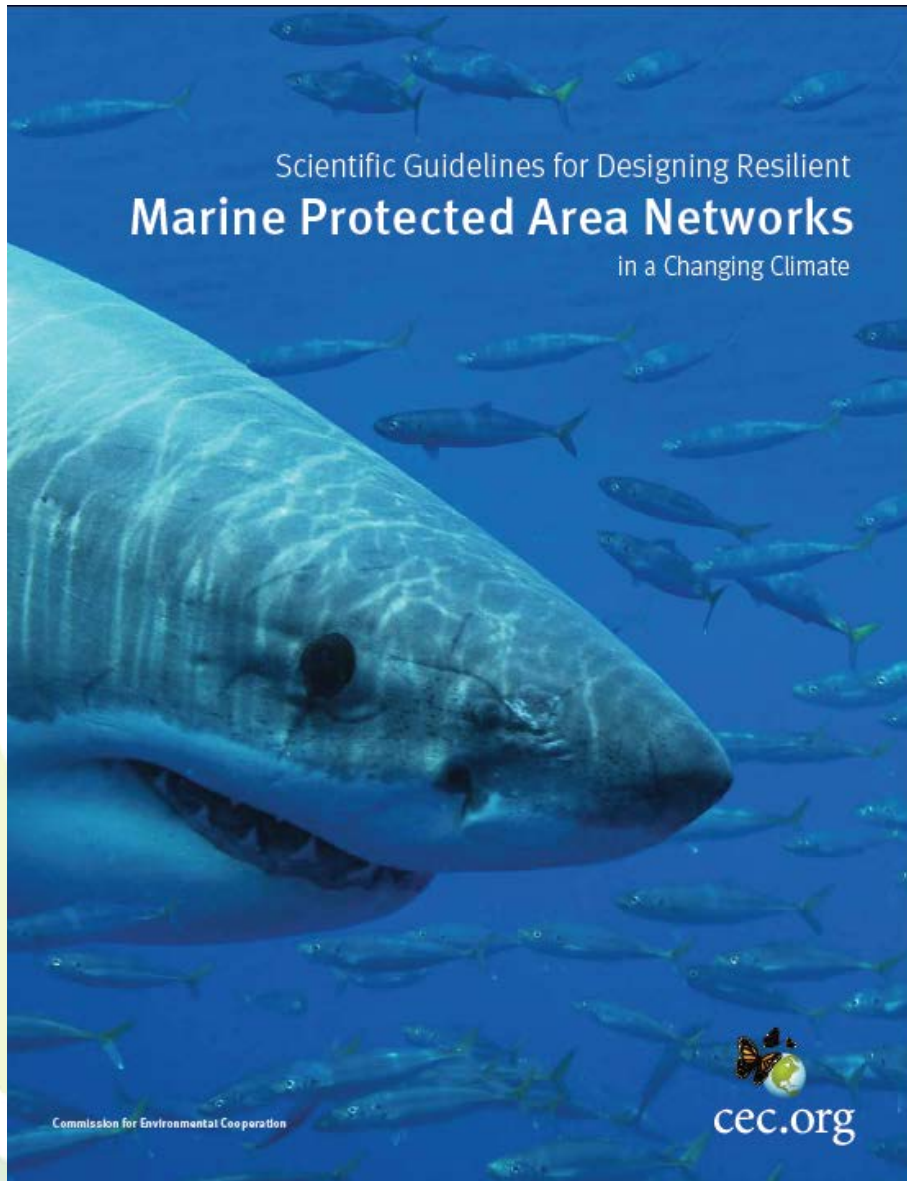


Ehler, 2011

1. Climate Change
2. Biodiversity Loss
3. Pollution
4. Development
5. Habitat Loss and Fragmentation

Sherman y Adams, 2013

1. Global Warming
2. Eutrophication and Ocean Acidification
3. Biodiversity Loss and Critical Habitats
4. Overfishing
5. Pollution



## **MARINE PROTECTED AREA NETWORK**

**Brock et al. 2012**

### **Objectives**

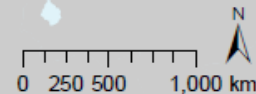
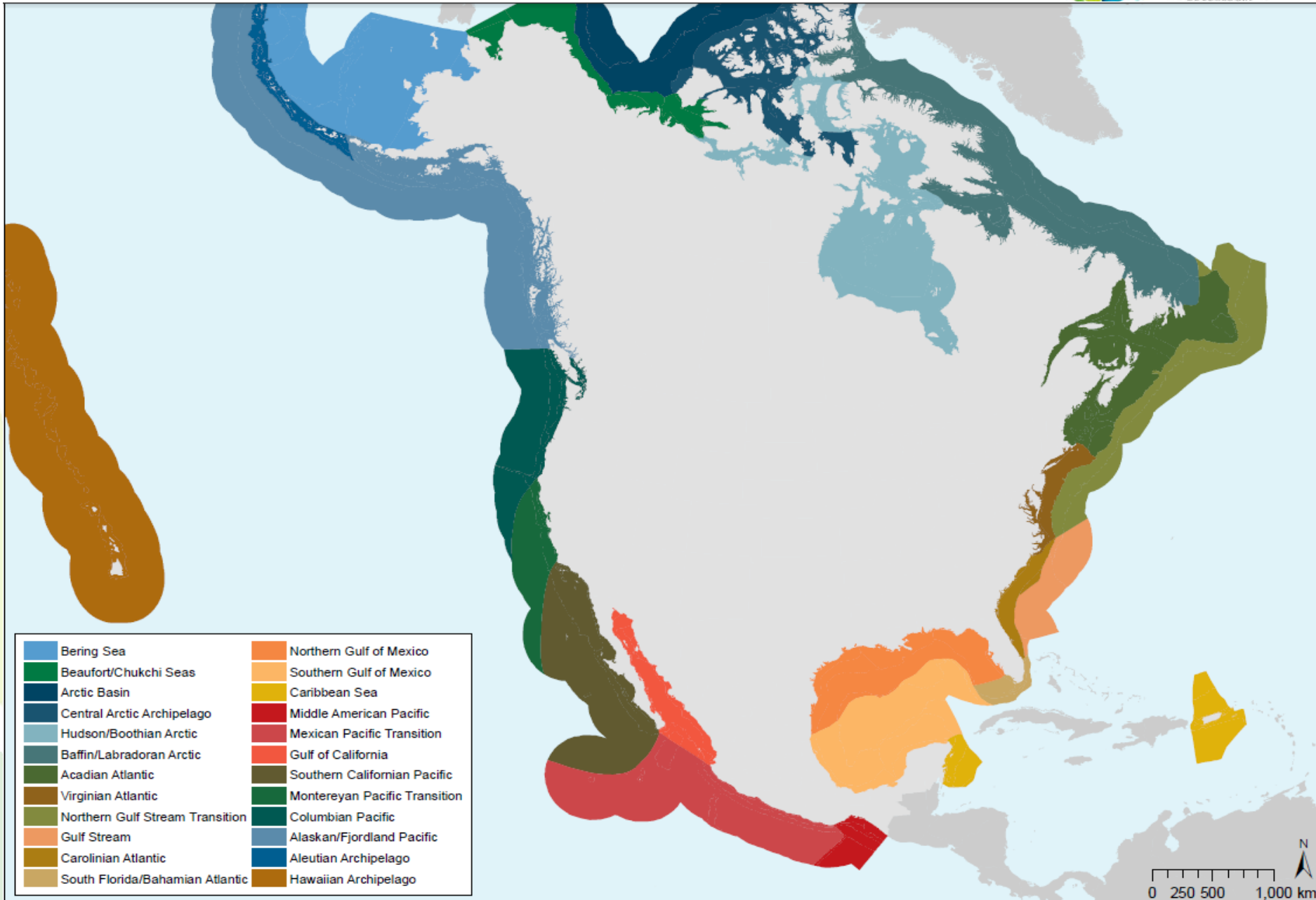
Guideline 1: Protect species and habitats with crucial ecosystem roles, or those of special conservation concern

Guideline 2: Protect potential carbon sinks

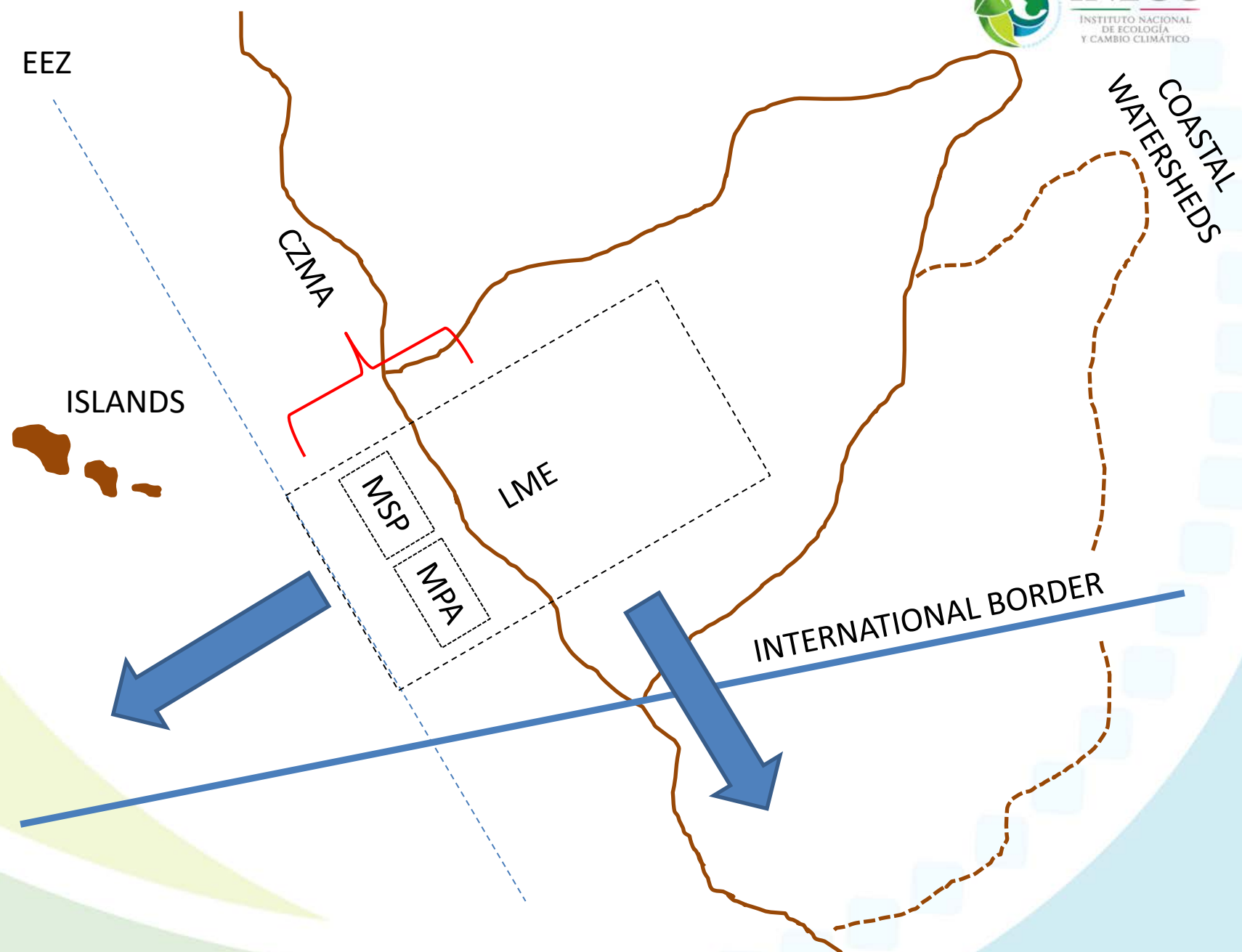
Guideline 3: Protect ecological linkages and connectivity pathways for a wide range of species.

Guideline 4: Protect the full range of biodiversity present in the target biogeographic area

# MARINE ECO-REGIONS OF NORTH AMERICA (CEC)







EEZ

CZMA

ISLANDS

MSP

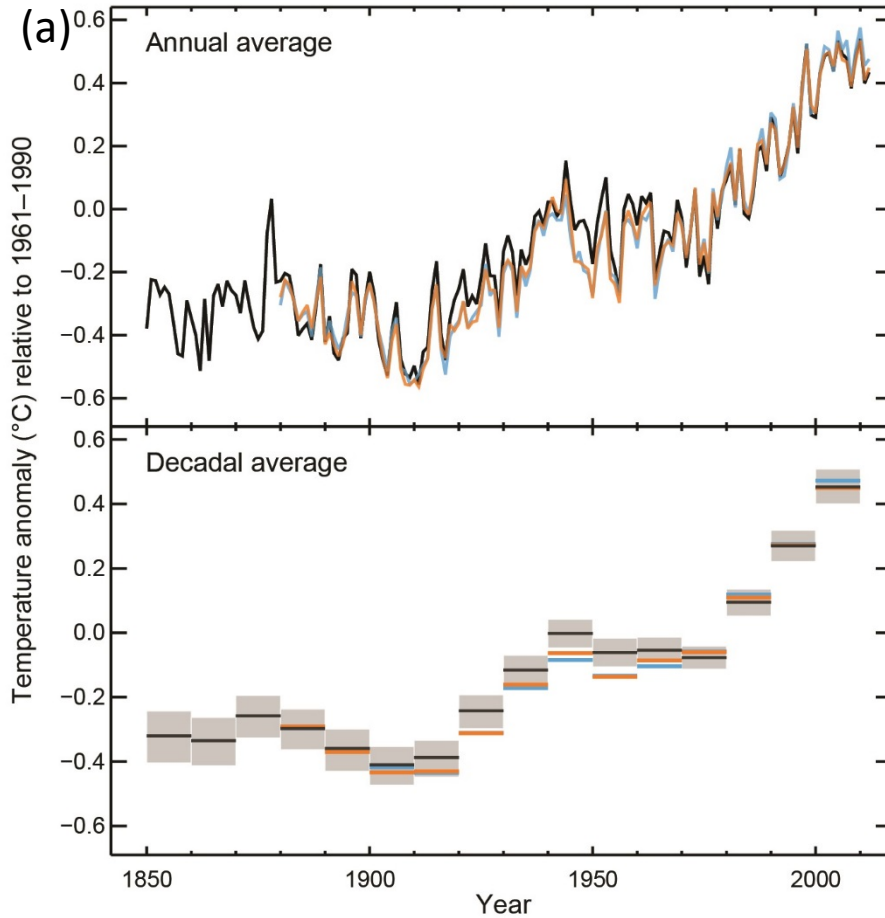
MPA

LME

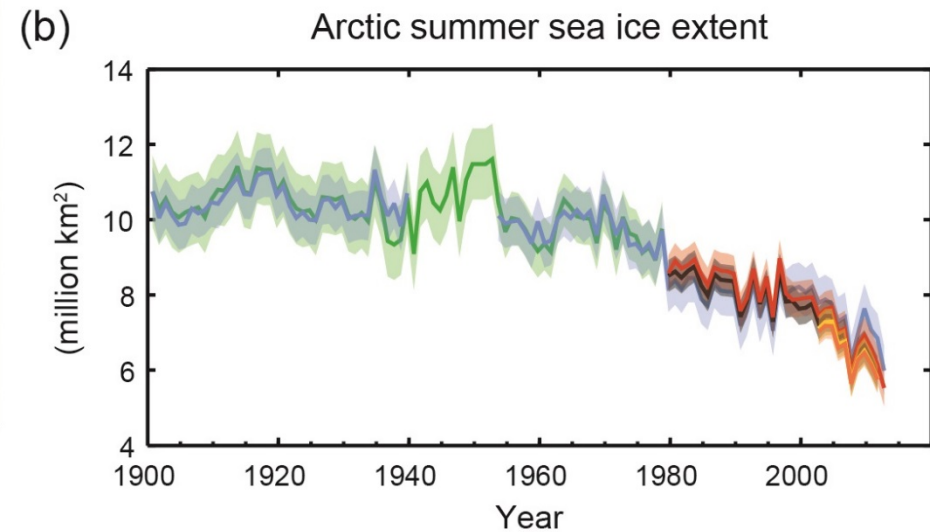
COASTAL  
WATERSHEDS

INTERNATIONAL BORDER

# GENERAL ASPECTS OF CLIMATE CHANGE: EVIDENCE

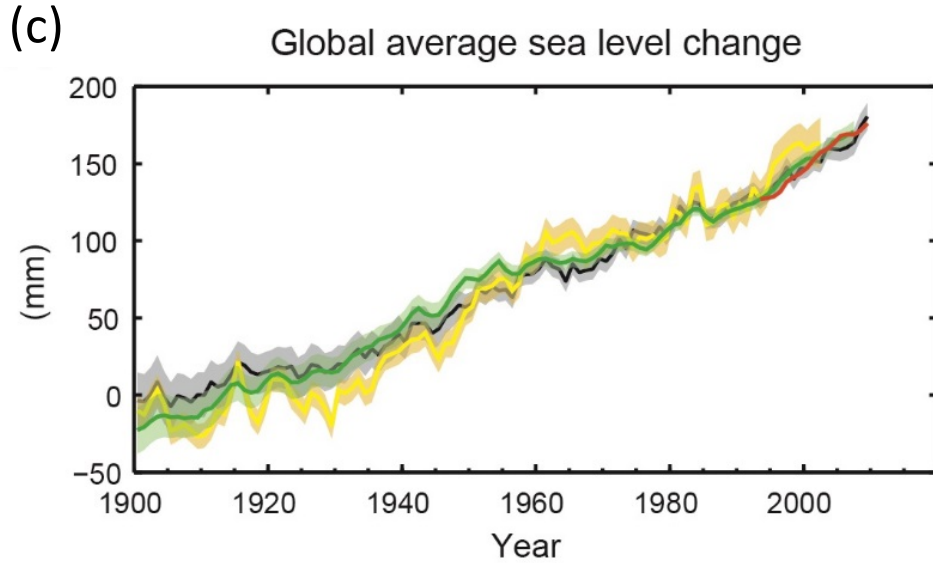


SOURCE: IPCC-SPM (2013, p.6)

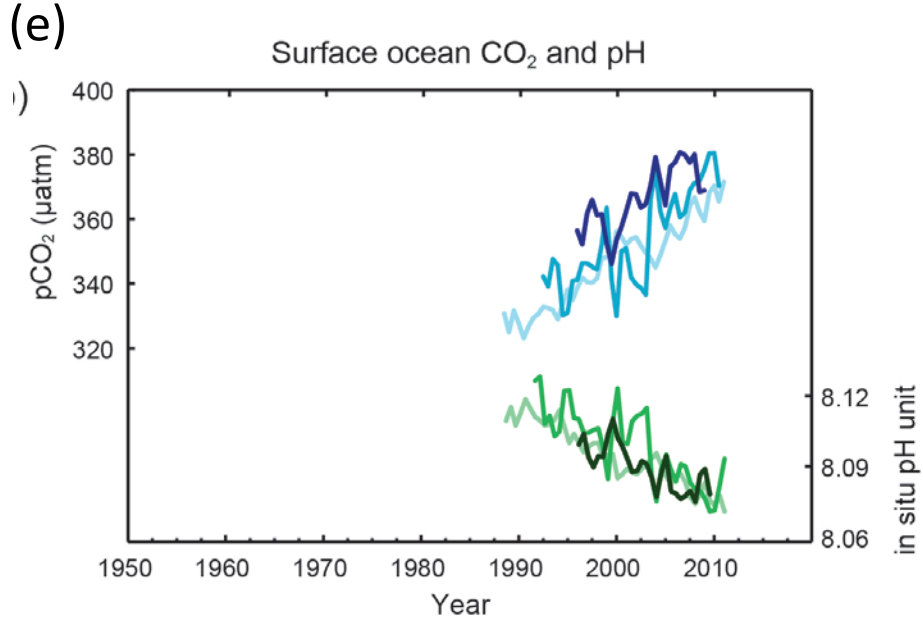
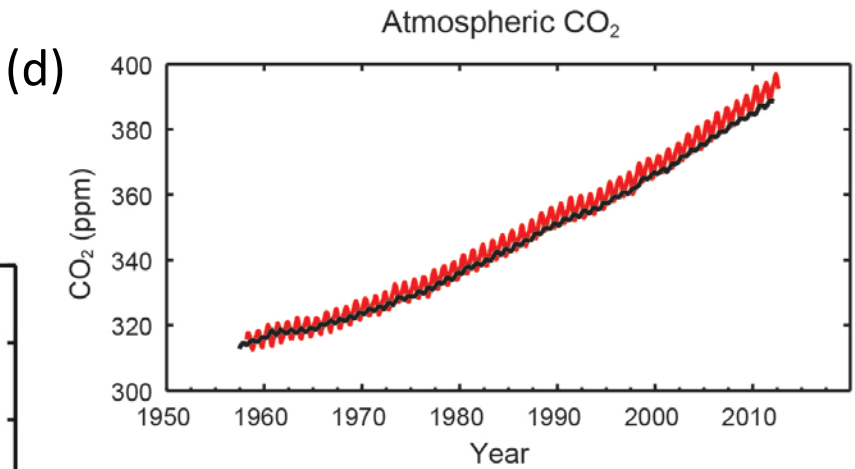


SOURCE: IPCC-SPM (2013, p.10)

# GENERAL ASPECT OF CLIMATE CHANGE: EVIDENCE



SOURCE: IPCC-SPM (2013, p.10)



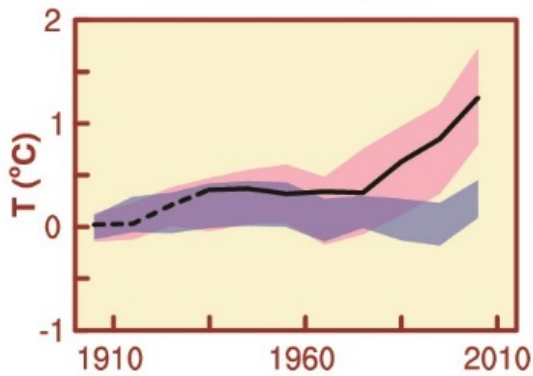
SOURCE: IPCC-SPM (2013, p.12)

# GENERAL ASPECTS OF CLIMATE CHANGE: EVIDENCE

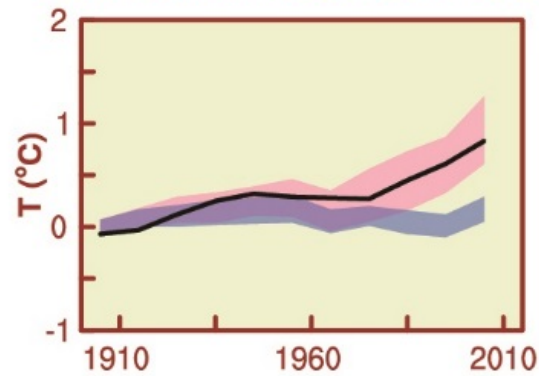
## Global averages

(f)

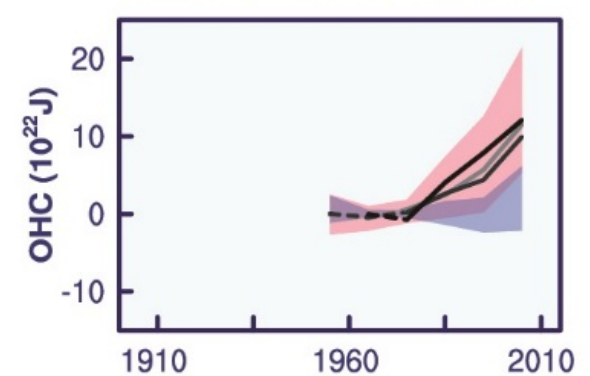
Land surface



Land and ocean surface

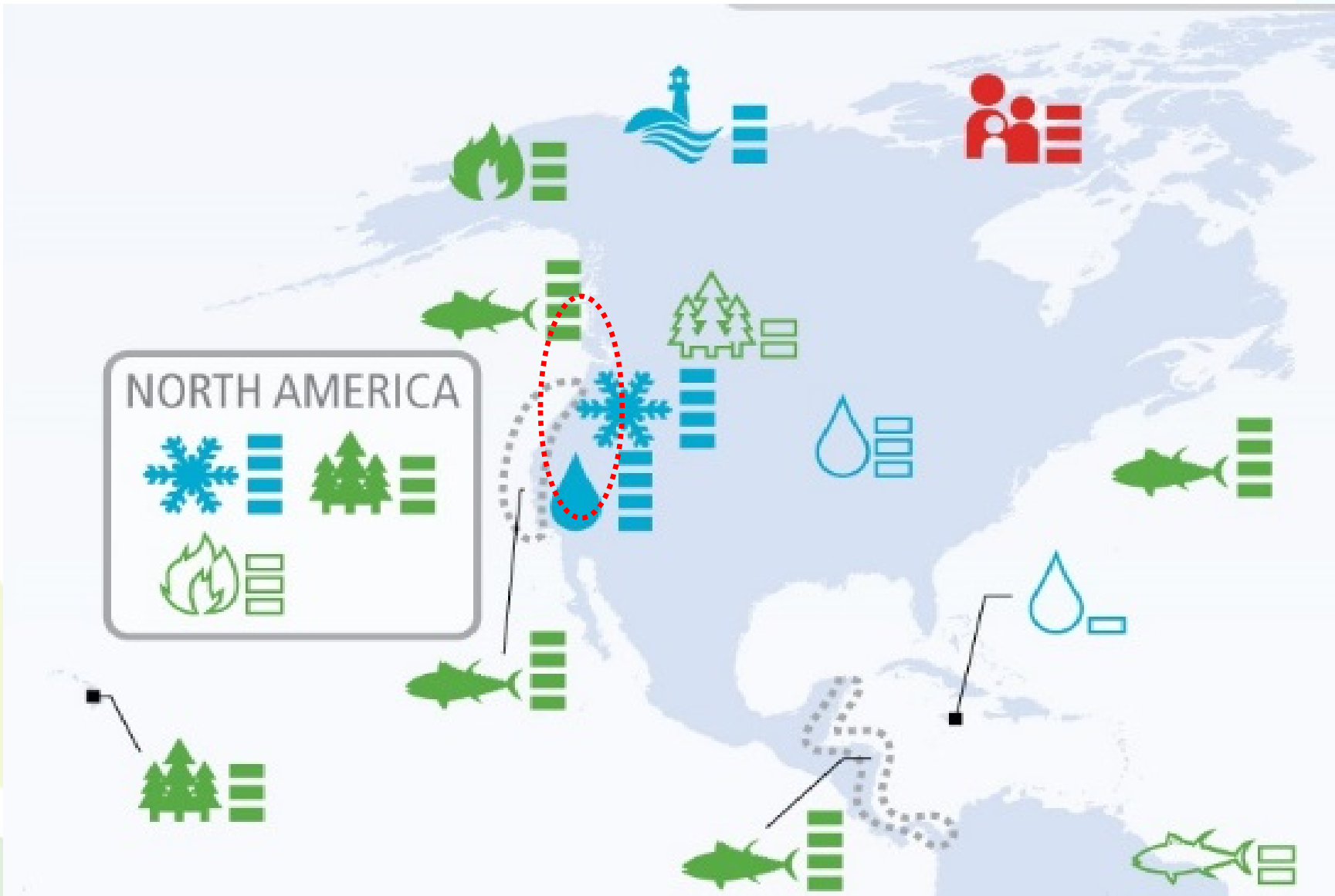


Ocean heat content



SOURCE: IPCC-SPM (2013, p.18)

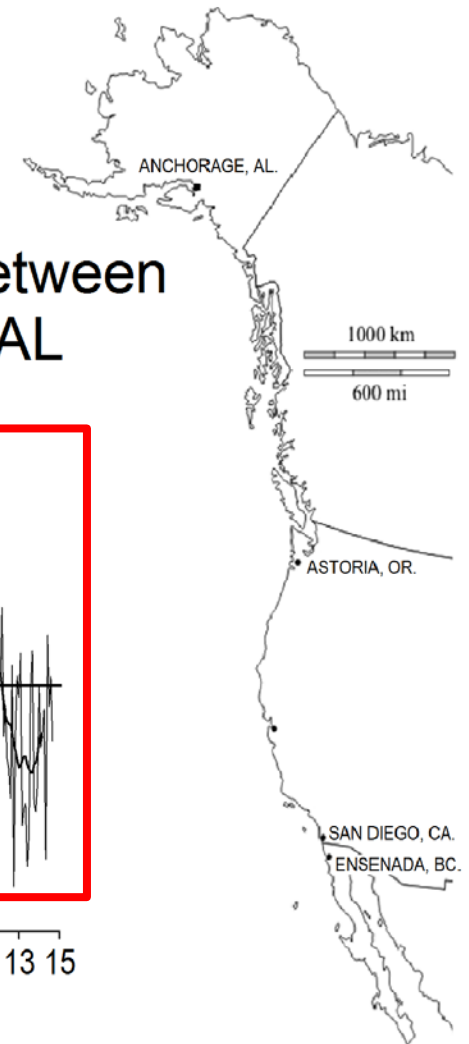
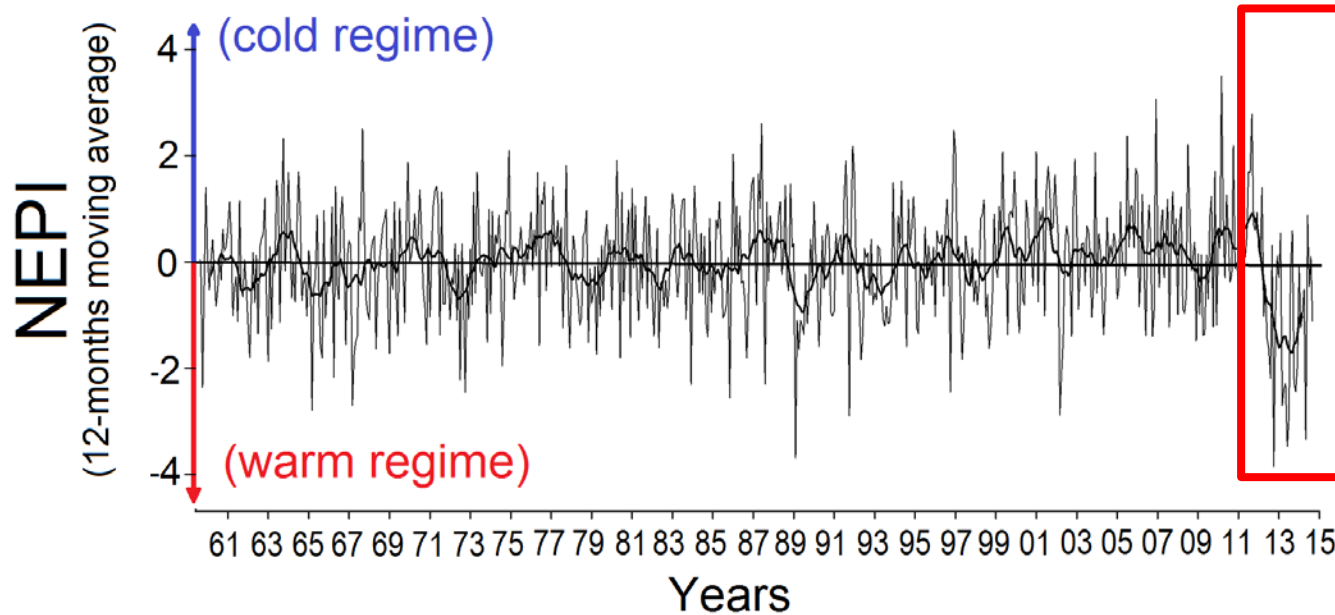
# GLOBAL RECENT IMPACTS BY CLIMATE CHANGE



SOURCE: IPCC (2014, p.7)

# NORTHEASTERN PACIFIC INDEX (NEPI)

NorthEastern Pacific Index (NEPI): monthly SLP between San Diego, CA/Ensenada, BC, minus Anchorage, AL



\* <http://www.inecc.gob.mx/descargas/dgioece/NEPI.pdf>

Figure 1

# Monthly Sea Level Pressure (SLP) anomalies trend. (12-months moving average)

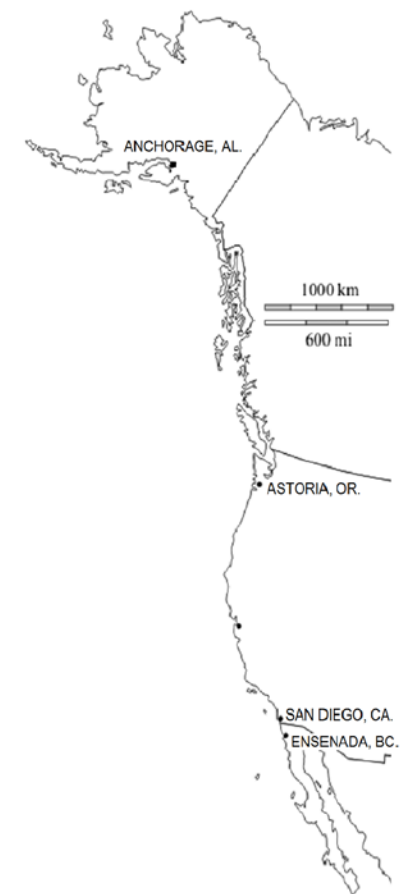
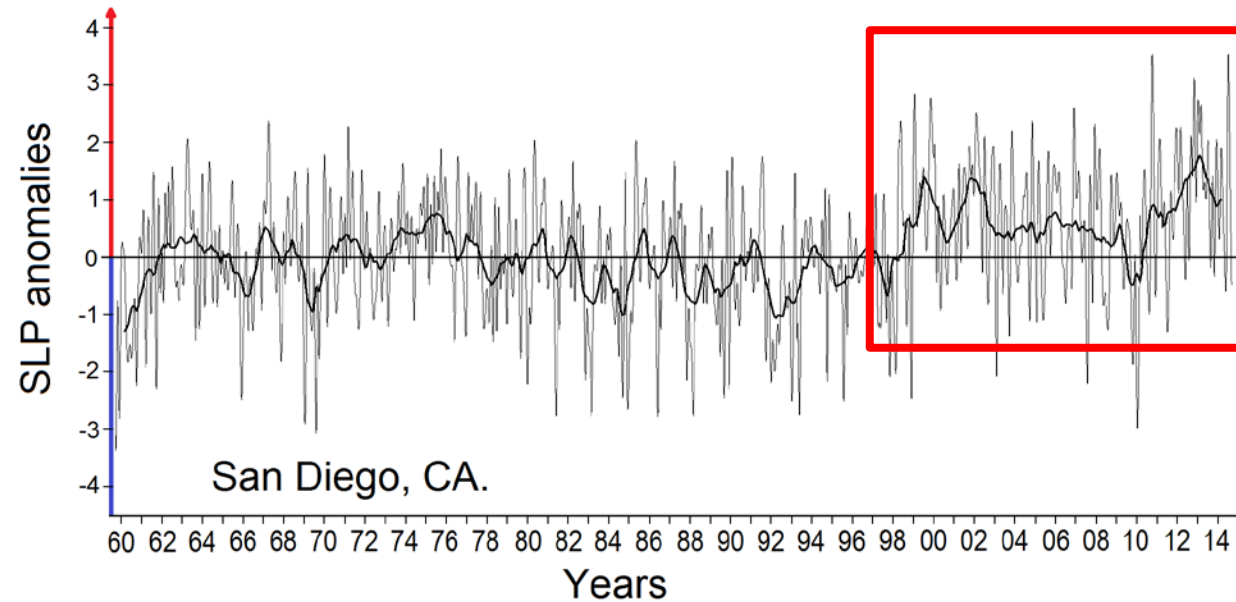
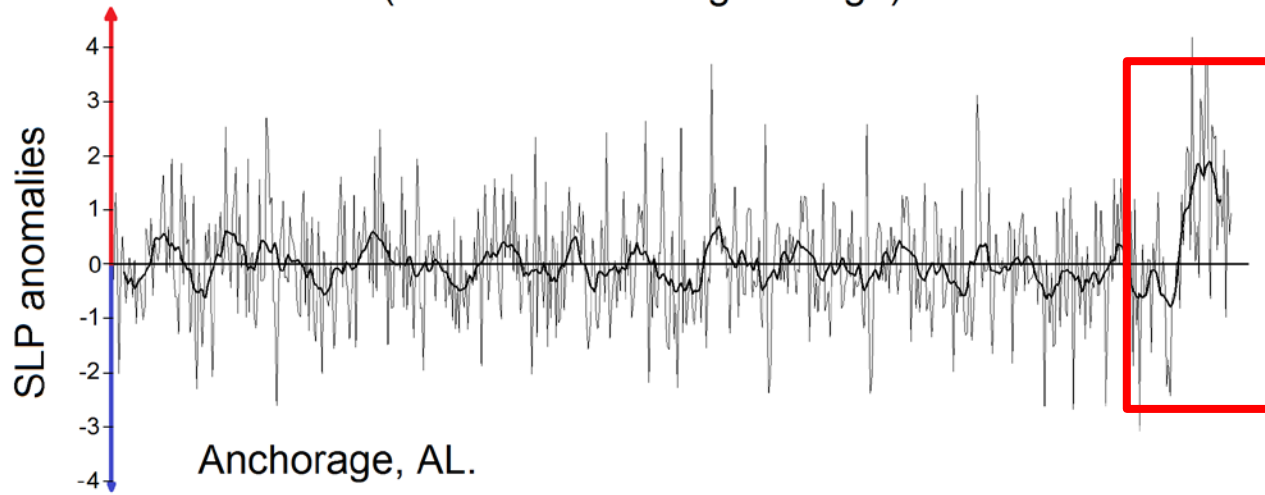


Figure 2

# Monthly Sea Level Pressure (SLP) anomalies trend. (12-months moving average)

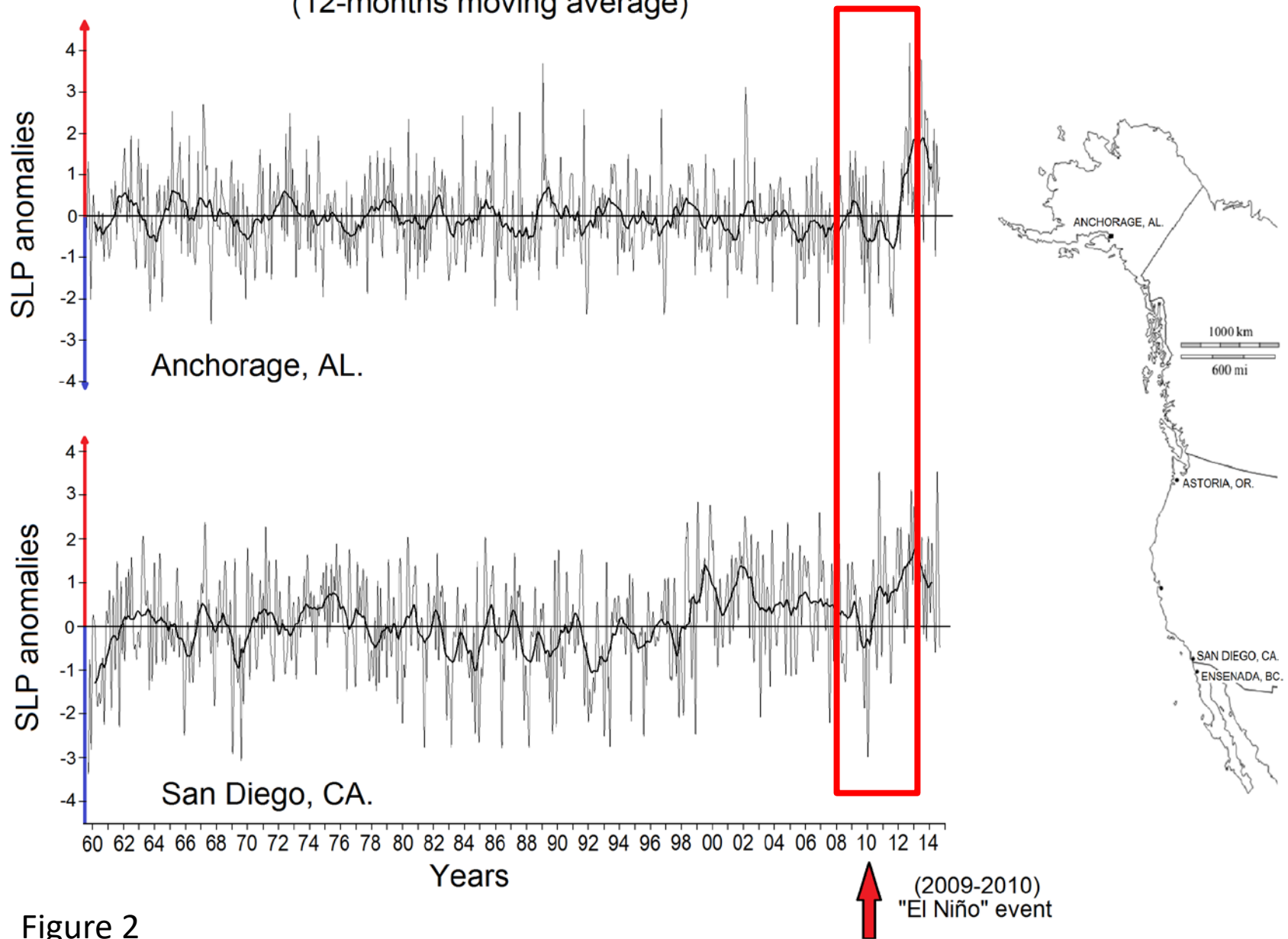


Figure 2



# Monthly Air Temperatur (AT) anomalies at surface (°C) trend. (12-months moving average)

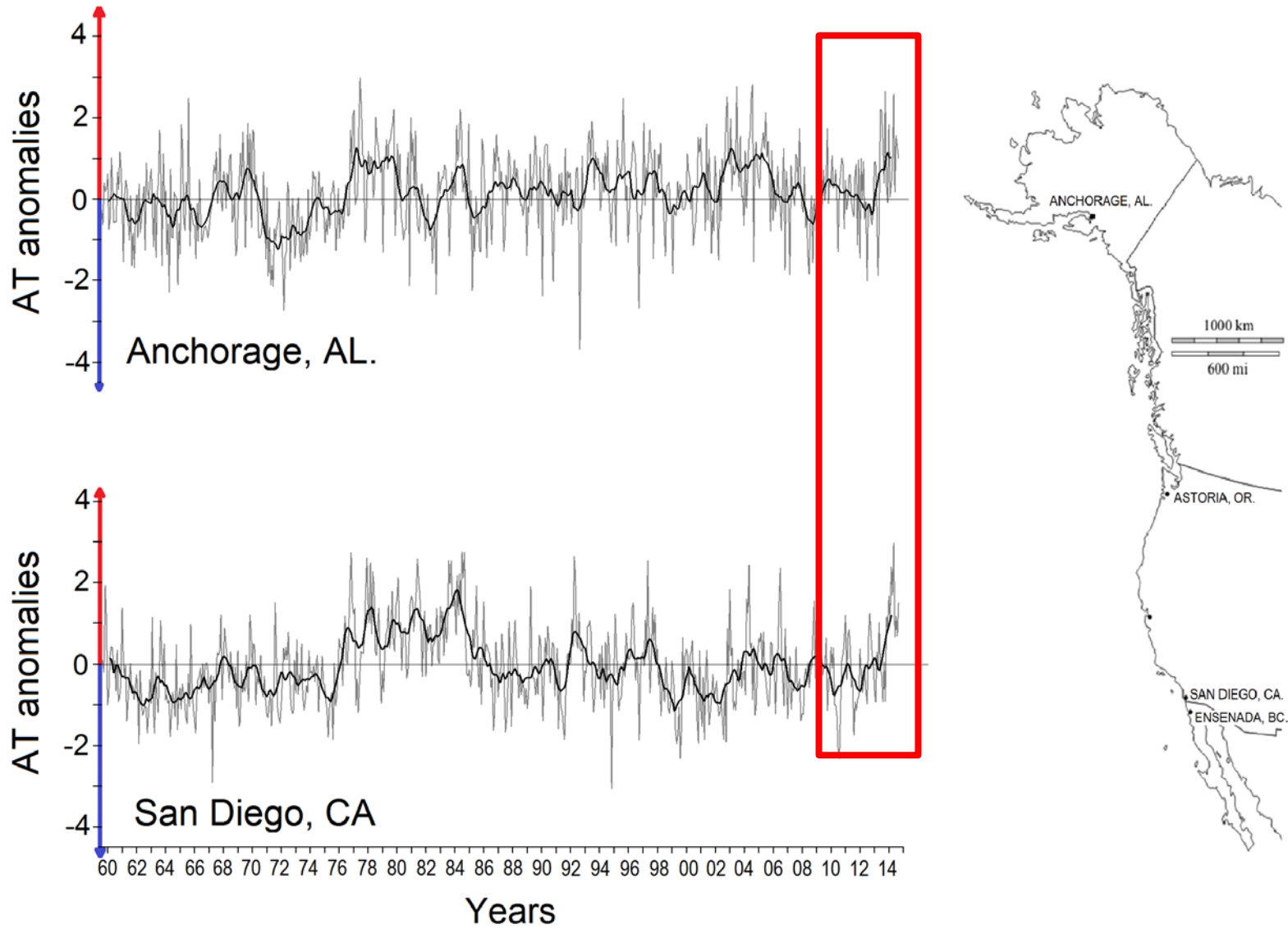


Figure 3

# Annual Air Temperature (°C) anomalies trend

## Ted Stevens Anchorage International Airport (26451/ANC)

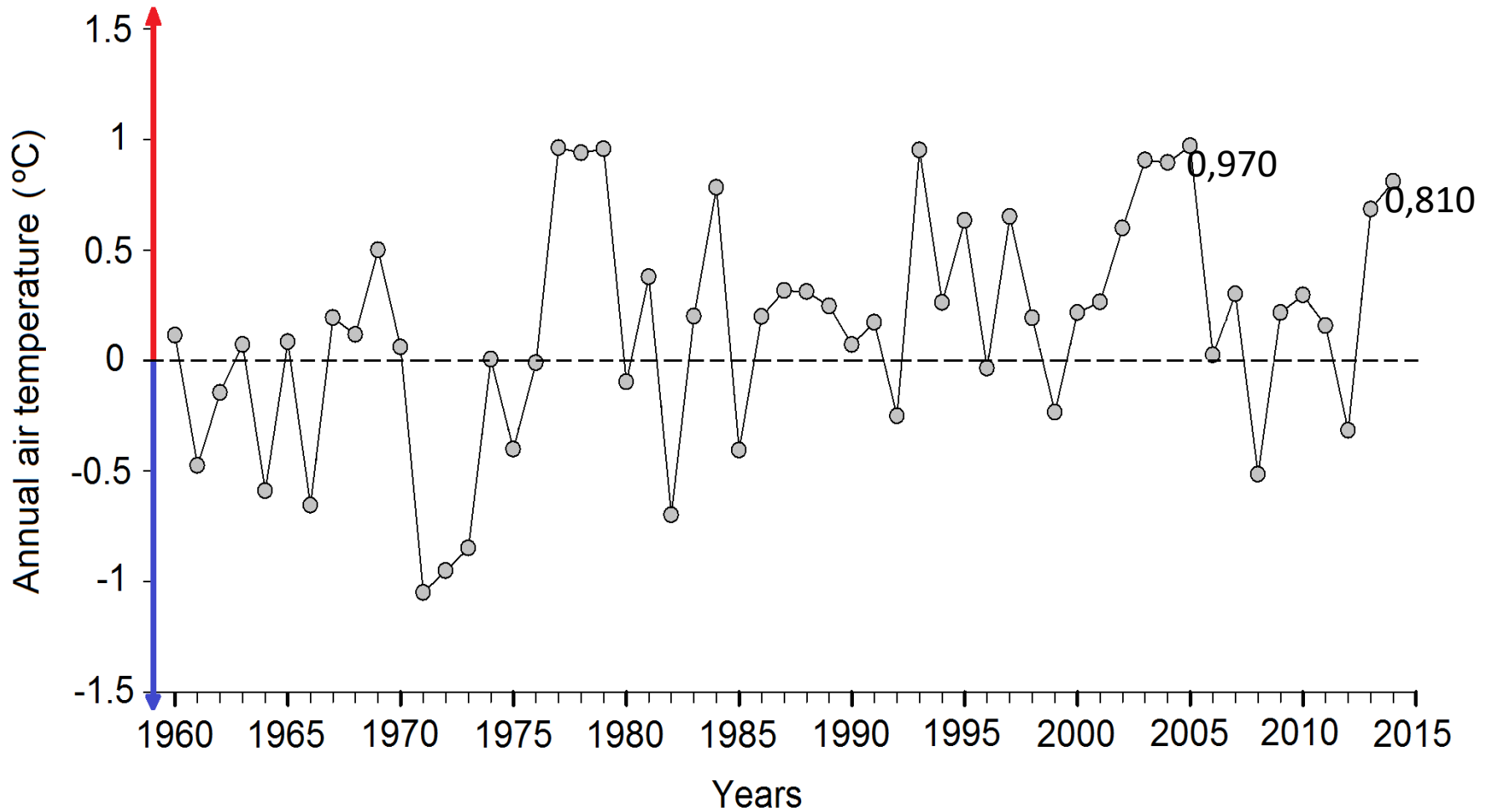


Figure 4

# Annual Air Temperature ( $^{\circ}\text{C}$ ) anomalies in COLD and WARM season in Meteorological Station of the International Airport, Anchorage, Alaska from 1960 to 2014.

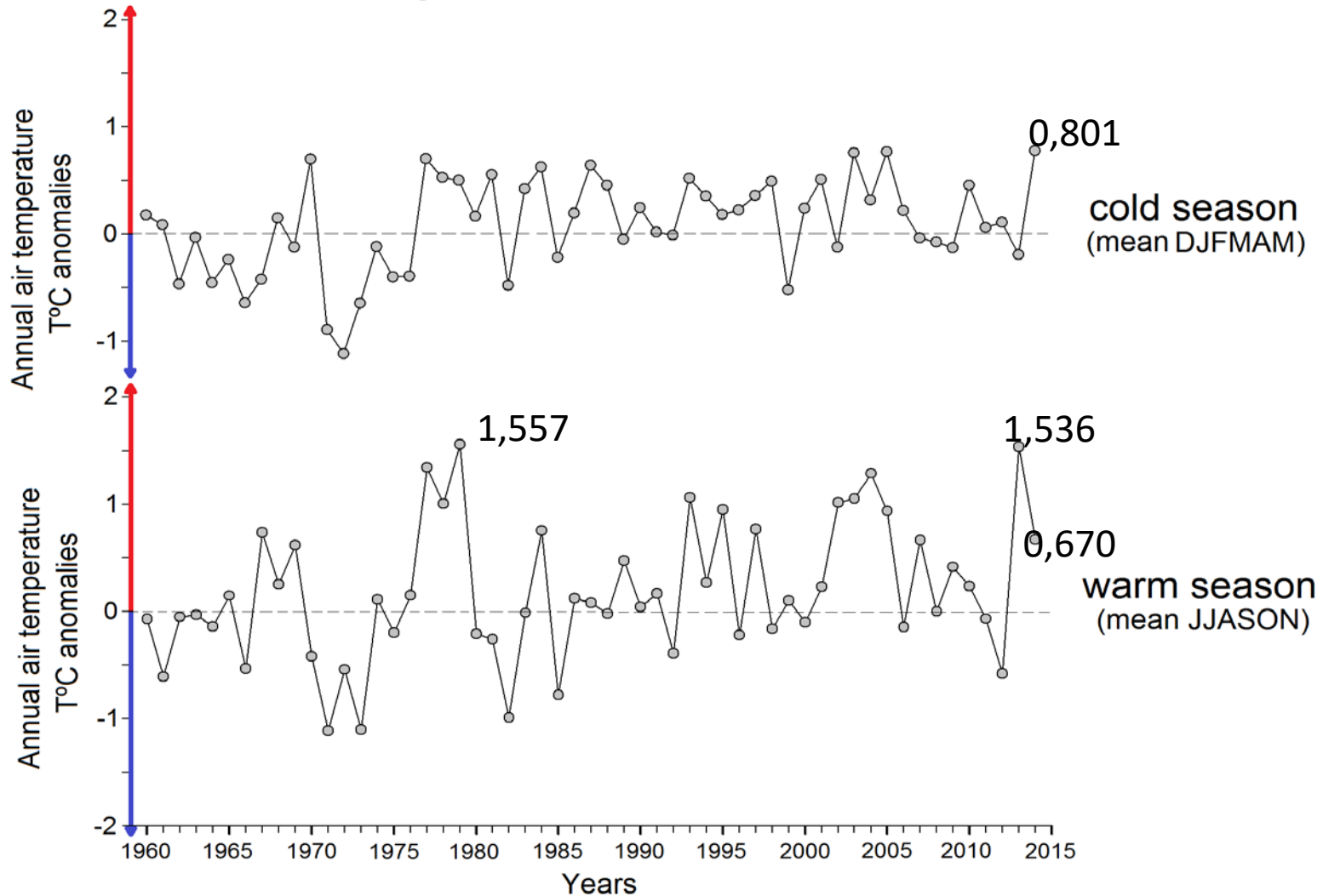


Figure 5

# Annual Air Temperature ( $^{\circ}\text{C}$ ) anomalies (SONDJF mean) at surface in Anchorage, AL.

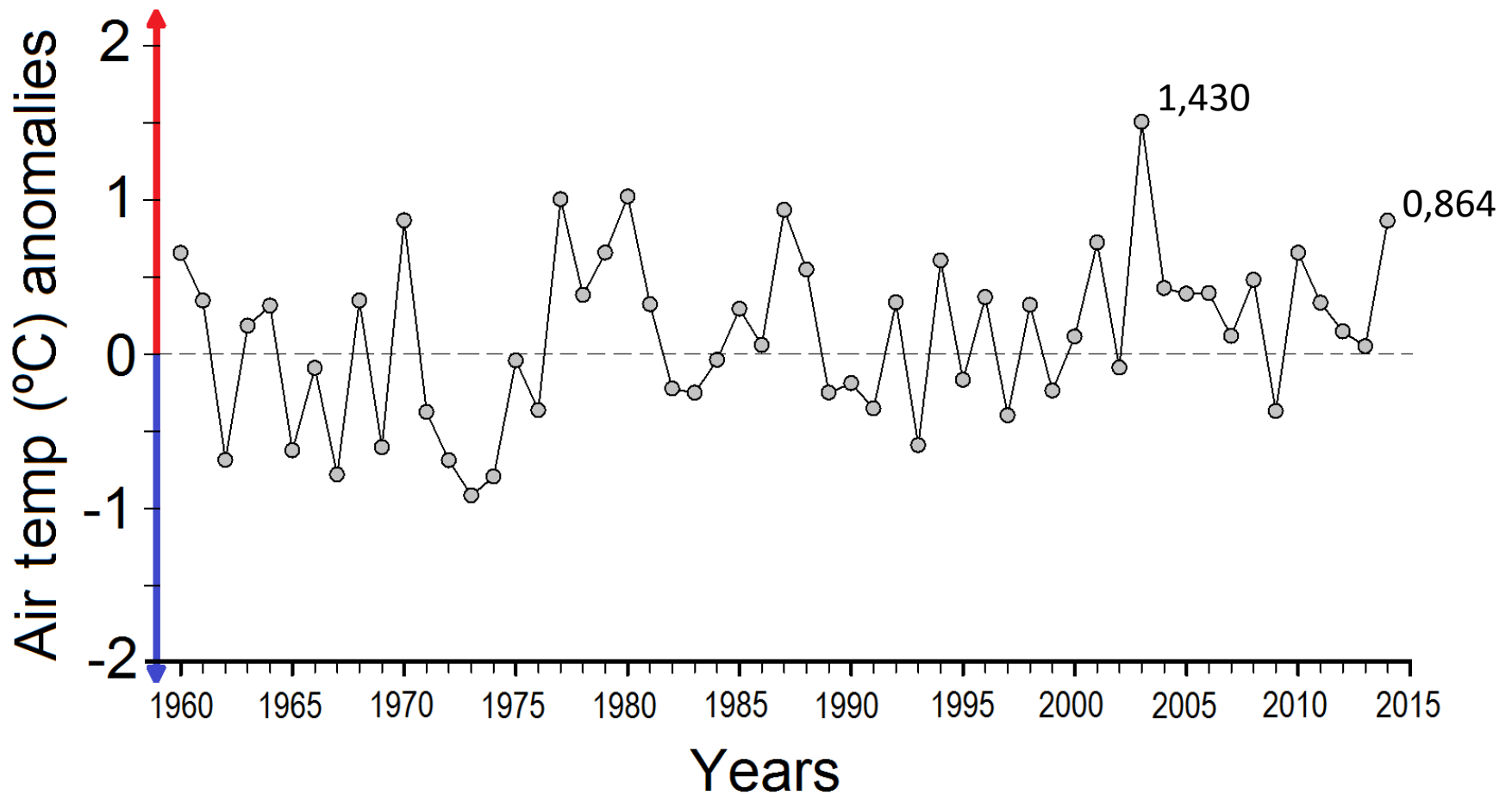


Figure 6

# TSM

# EL UNIVERSAL

 Cartagena Sucesos Sociales Deportes Regional Opinión Política Clasificados Secciones 

**Temas de interés** Cierre de playas Eclipse de luna Ébola Diálogos de paz con las Farc

 Clubvital    

Home > Ambiente >

## California intenta enfriar agua para salvar peces

AP | @ElUniversalCtg | SAN FRANCISCO | 3 de Octubre de 2014 08:19 pm |



 Compartir  Tweet  Compartir  Enviar

“California tries to cool water to save fishes”

Figure 7

# MEXICO AND CLIMATE CHANGE

# REGULATIVE AND INSTITUTIONAL FRAMEWORK

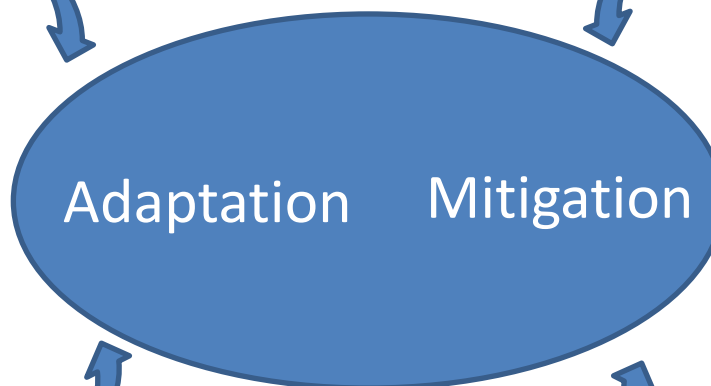


DEVELOPMENT NATIONAL PLAN  
2013-2018

INSTITUTIONAL PROGRAMME  
INECC  
2014-2018



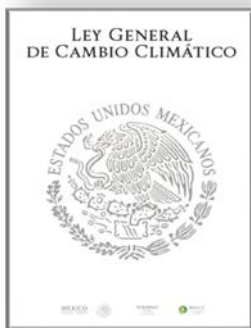
CLIMATE CHANGE



Adaptation Mitigation

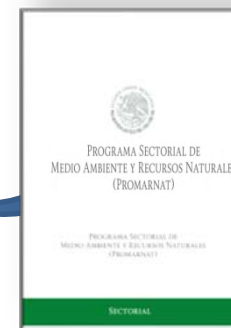


CLIMATE CHANGE  
GENERAL  
LAW  
2012



COASTAL-MARINE  
ECOSYSTEMS

SECTORIAL  
PROGRAMME  
SEMARNAT



SPECIAL PROGRAMME OF  
CLIMATE CHANGE 2014-2018



NATIONAL STRATEGY  
OF CLIMATE CHANGE  
10-20-40



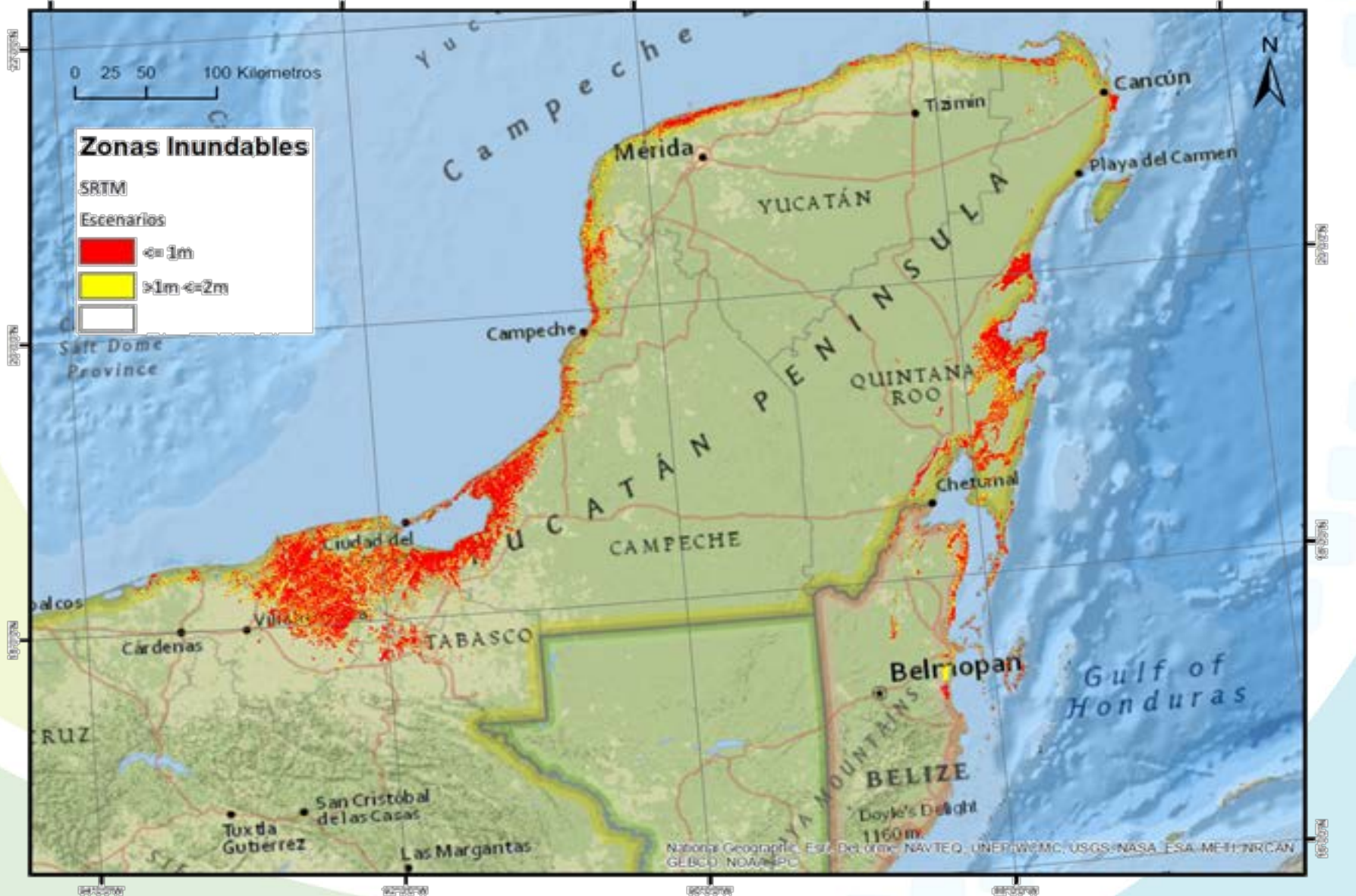


# SPECIFIC SURVEYS

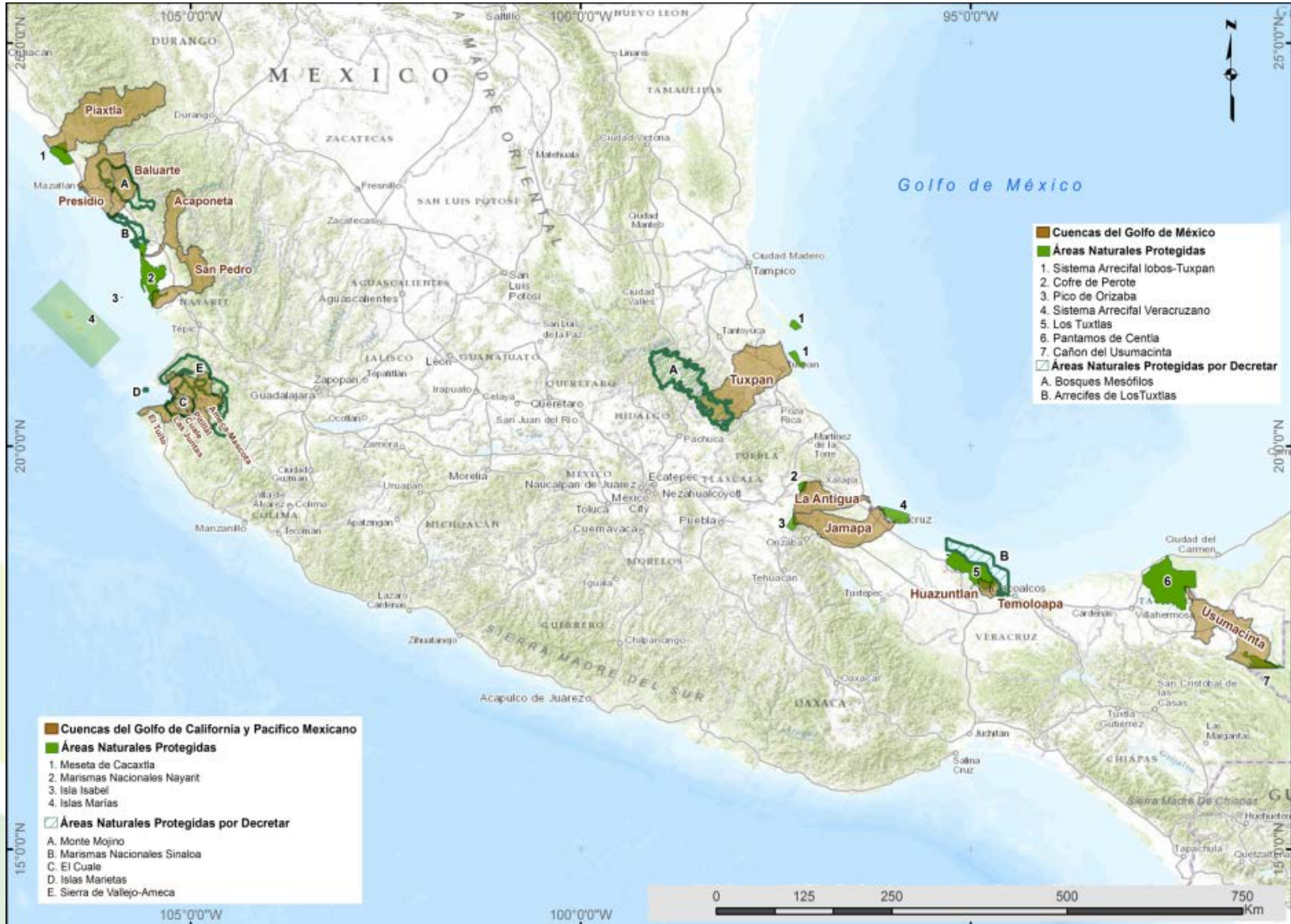
# SEA LEVEL STATIC-RISE SCENARIOS (1 AND 2m) (PRELIMINARY OUTCOMES FOR THE YUCATAN PENINSULA)



Zonas Susceptibles a Inundacion 1 y 2 m



# COASTAL WATERSHEDS CONSERVATION IN THE CONTEXT OF CLIMATE CHANGE (GEF 2013-2018)



# COASTAL WETLAND ADAPTATION PROJECT IN THE GULF OF MEXICO (GEF 2011-2015)



## SELECTED SITES

ALVARADO COASTAL LAGOON

COASTAL SYSTEM CARMEN-  
PAJONAL-MACHONA

SIAAN KAAN COASTAL  
PROTECTED AREA



# NATIONAL CLIMATE CHANGE SCENARIOS WEB SITE

<http://escenarios.inecc.gob.mx/>



- Inicio
- Métricas
- Escenarios**
- Indices Extremos
- Enlaces de Interés
- Contacto
- Ayuda
- Agradecimientos

**Consulta**

Variables:

Tipo:

Escenario:

Periodo:

**Opciones de gráfico**

Gráfico:

Tiempo:

Mes Inicial:

Mes Final:

Comparar con Historico (REA)

**Coordenadas**

Latitud Max:

Longitud Max:

Latitud Min:

Longitud Min:





# INECC

INSTITUTO NACIONAL  
DE ECOLOGÍA  
Y CAMBIO CLIMÁTICO