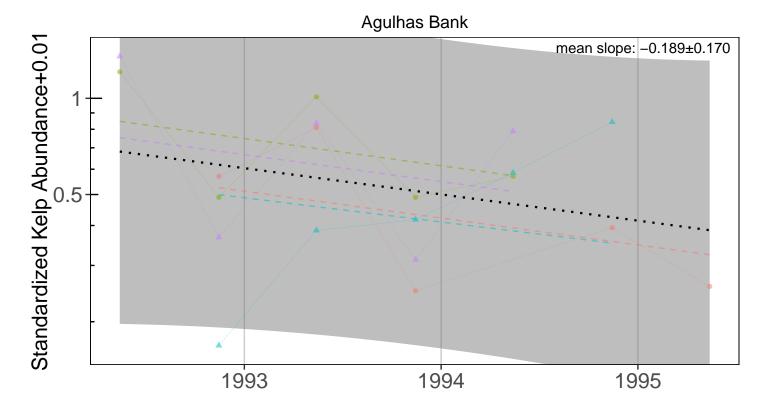
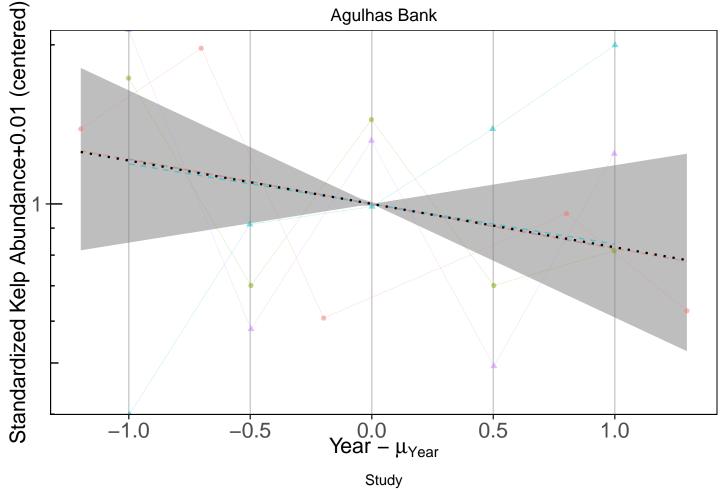


Study
• Levitt\_etal\_2002 • SA\_Gansbaai\_kelp\_data

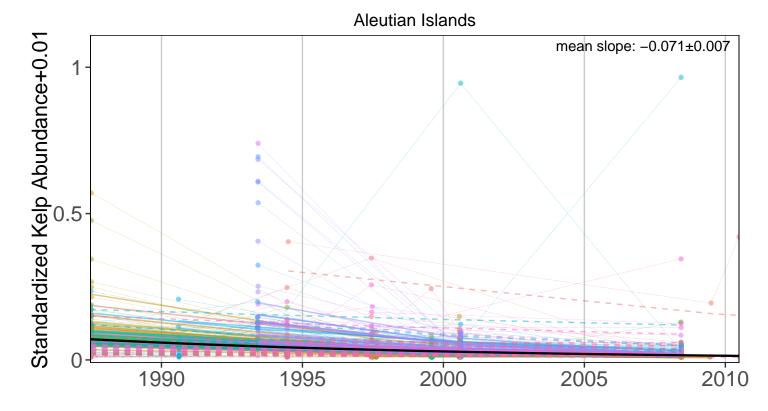


Study
• Levitt\_etal\_2002 • SA\_Gansbaai\_kelp\_data



Levitt\_etal\_2002 

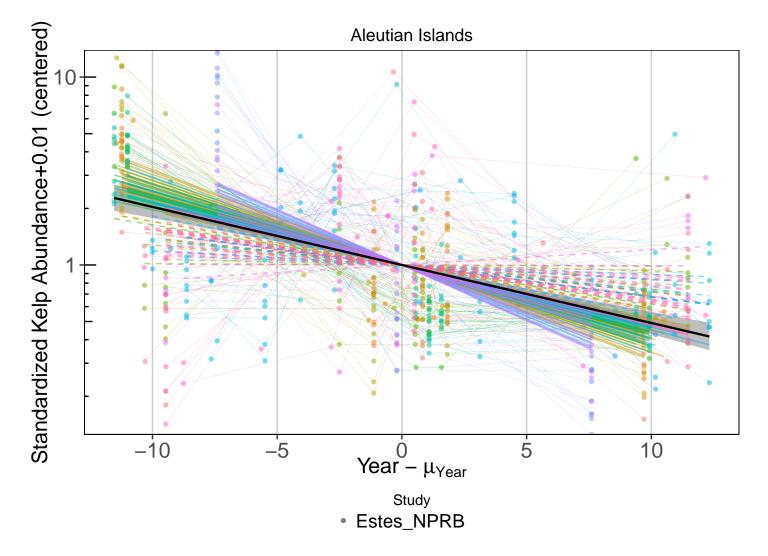
 SA\_Gansbaai\_kelp\_data

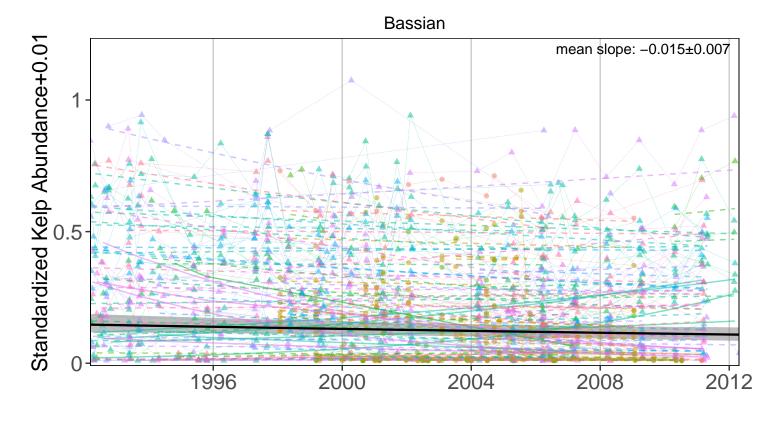


Study
• Estes\_NPRB

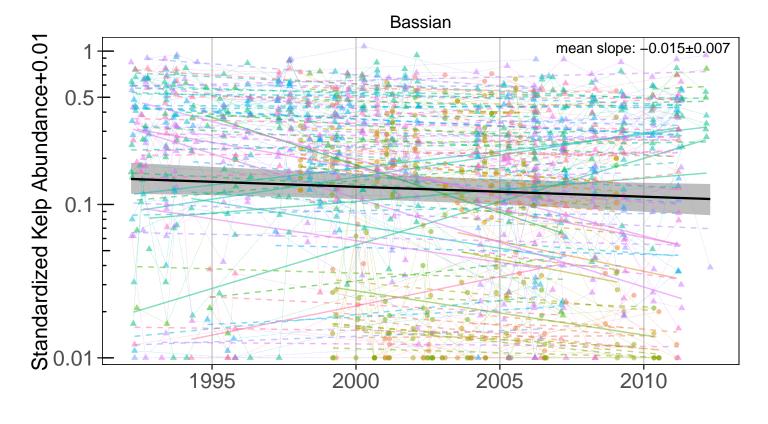
## Aleutian Islands Standardized Kelp Abundance+0.01 mean slope: -0.071±0.007 0.5 0.1 2010 2005 1990 1995 2000

Study
• Estes\_NPRB

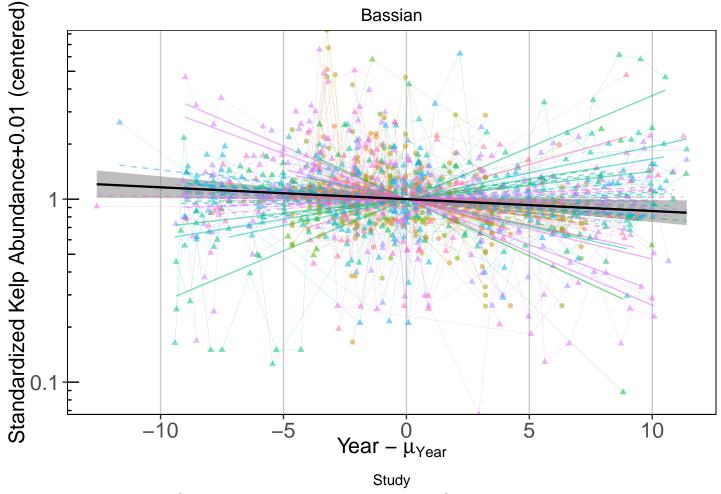




Study
• KelpCover\_Australia\_Victoria • KelpCover\_Temperate\_Australia

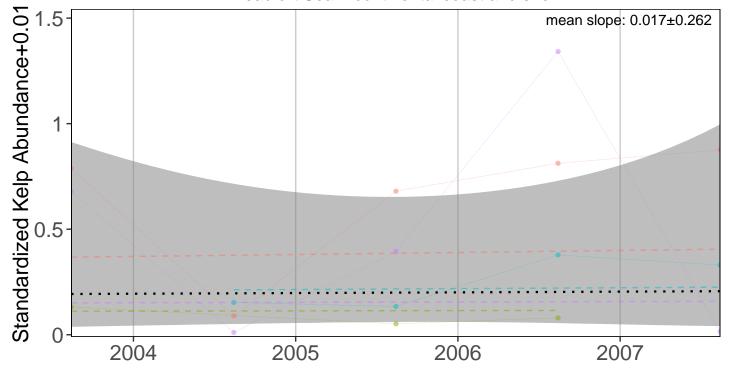


Study
• KelpCover\_Australia\_Victoria • KelpCover\_Temperate\_Australia



• KelpCover\_Australia\_Victoria • KelpCover\_Temperate\_Australia

## Beaufort Sea - continental coast and shelf



Study
• Konar\_Beaufort\_Sea

# Beaufort Sea - continental coast and shelf Standardized Kelp Abundance+0.01 mean slope: 0.017±0.262 0.5 0.1

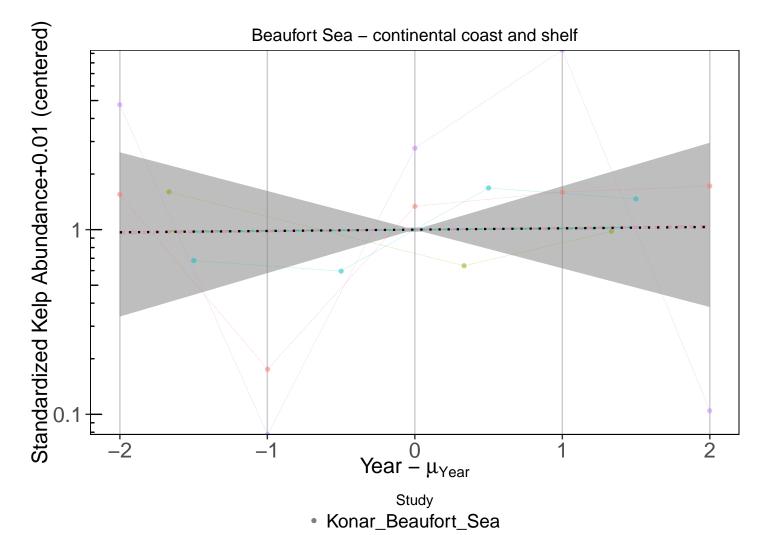
2005

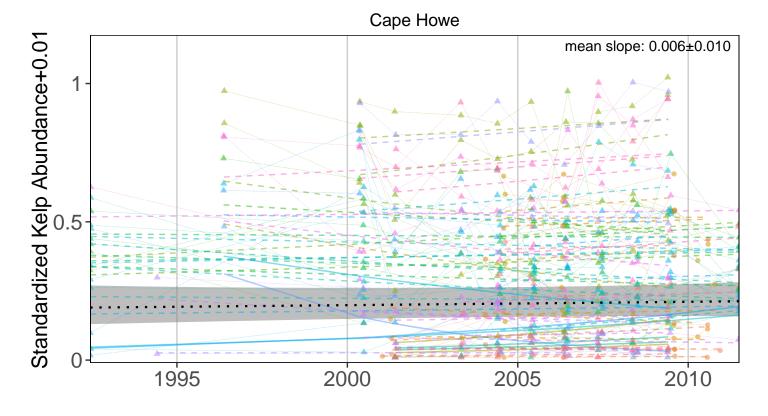
2004

Study
• Konar\_Beaufort\_Sea

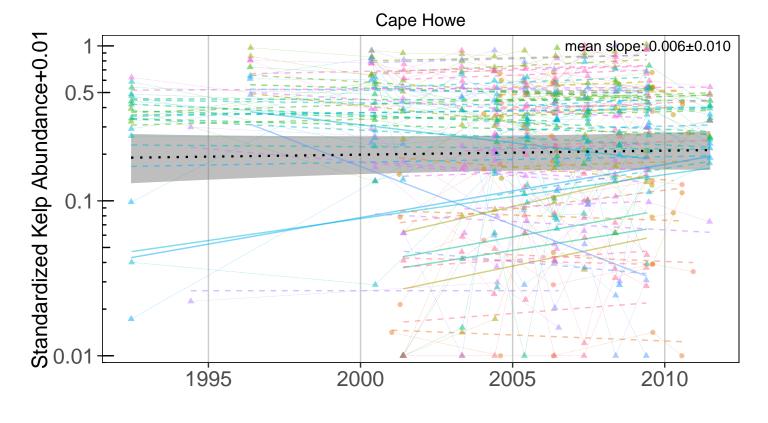
2006

2007

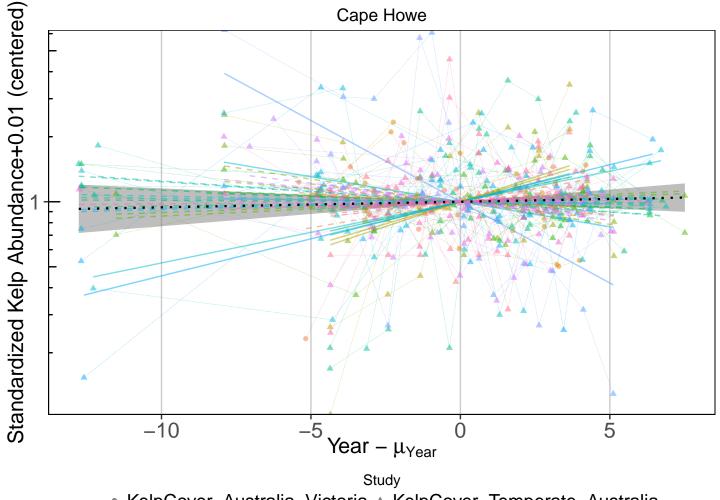




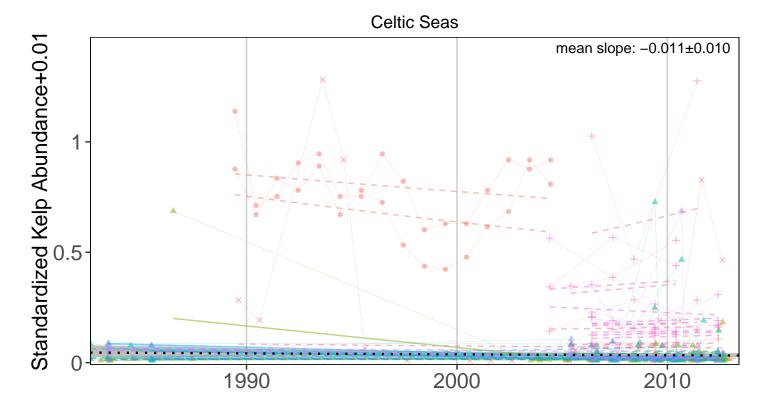
Study
• KelpCover\_Australia\_Victoria • KelpCover\_Temperate\_Australia



Study
• KelpCover\_Australia\_Victoria • KelpCover\_Temperate\_Australia



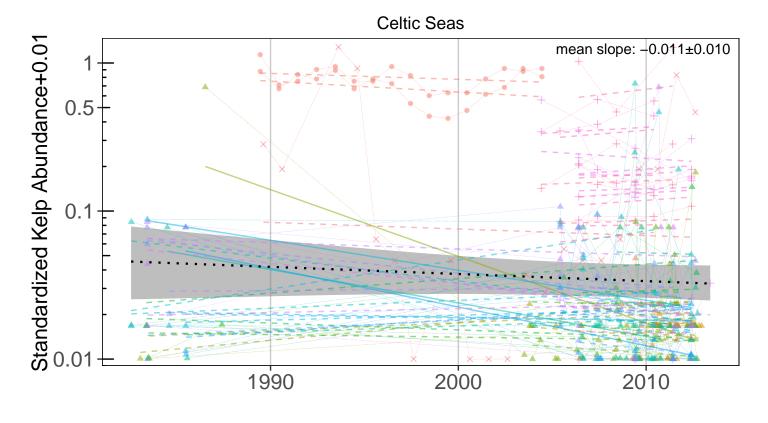
• KelpCover\_Australia\_Victoria • KelpCover\_Temperate\_Australia



## Study

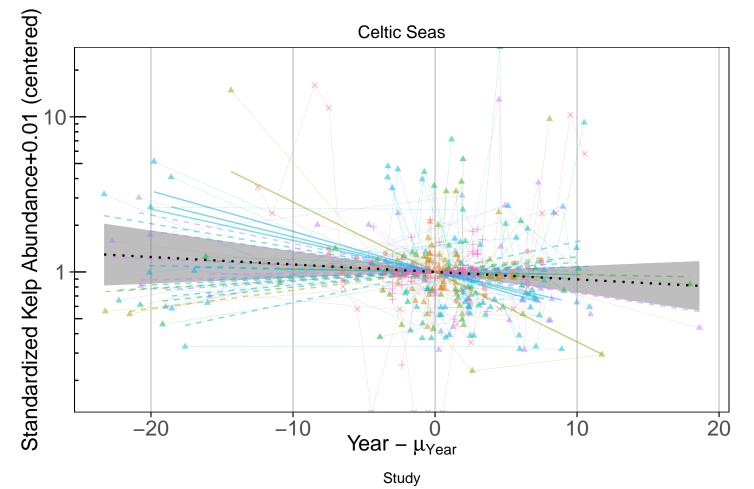
Davoult\_etal\_2011

- + REBENT\_Brittany\_NW\_France
- ▲ Northern\_Ireland\_Summary × Trowbridge\_etal\_2013



## Study

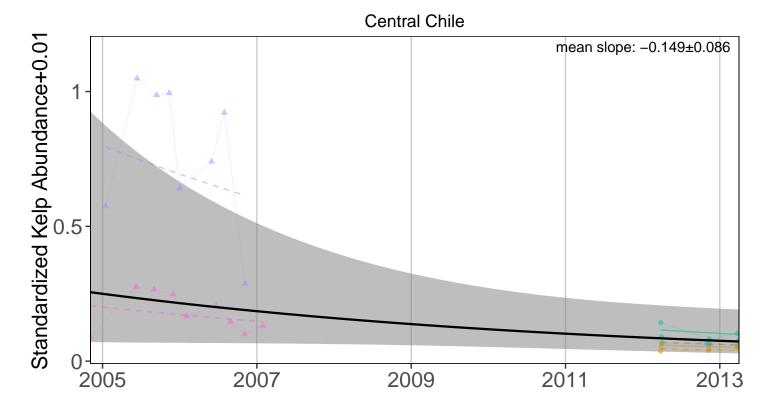
- Davoult\_etal\_2011 + REBENT\_Brittany\_NW\_France
- Northern\_Ireland\_Summary × Trowbridge\_etal\_2013



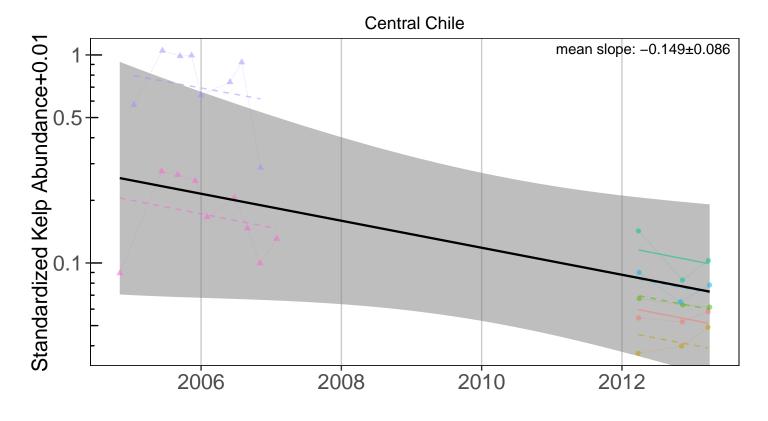
Davoult\_etal\_2011

+ REBENT\_Brittany\_NW\_France

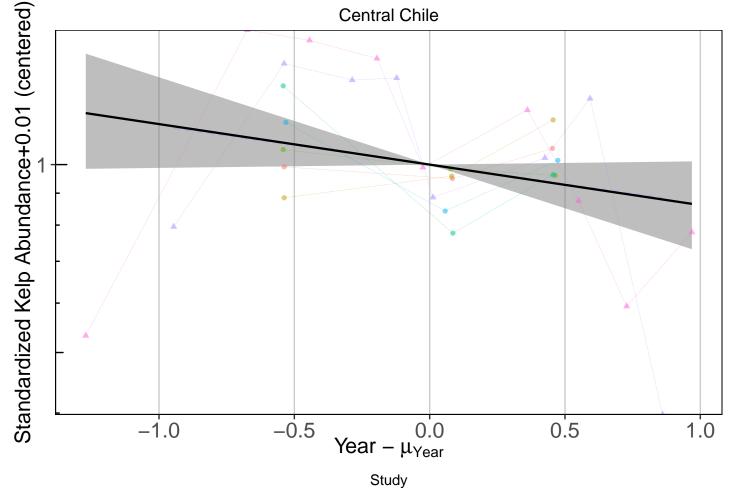
Northern\_Ireland\_Summary × Trowbridge\_etal\_2013



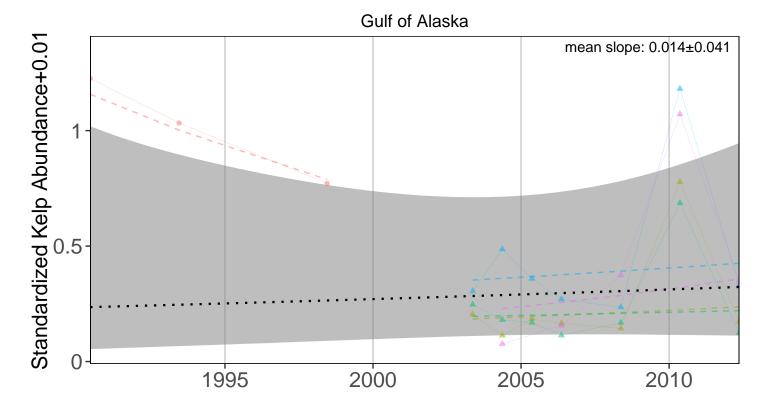
Study
• Central\_Chile\_Fondecyt • Northern\_Chile



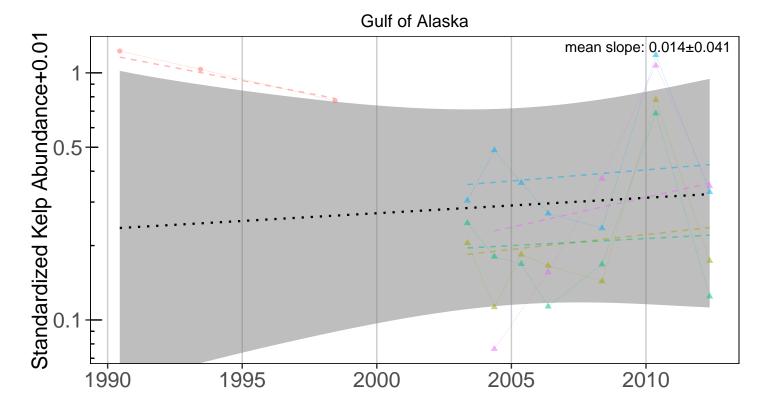
Study
• Central\_Chile\_Fondecyt • Northern\_Chile



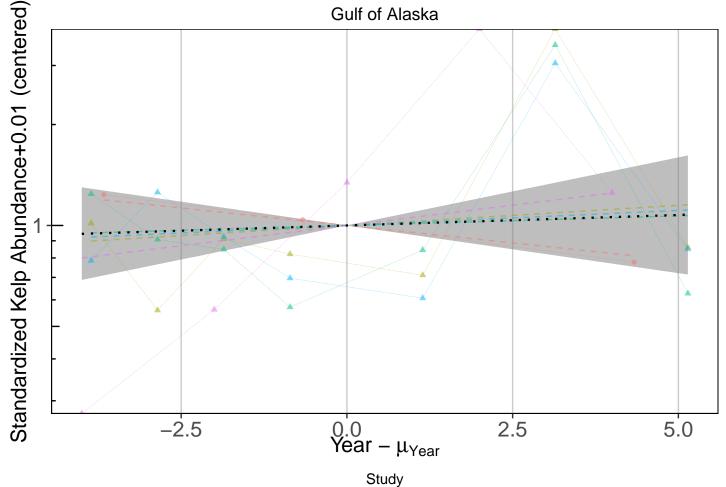
Central\_Chile\_Fondecyt A Northern\_Chile



Study
Dean\_etal\_2000 A konar\_GulfOfAlaska

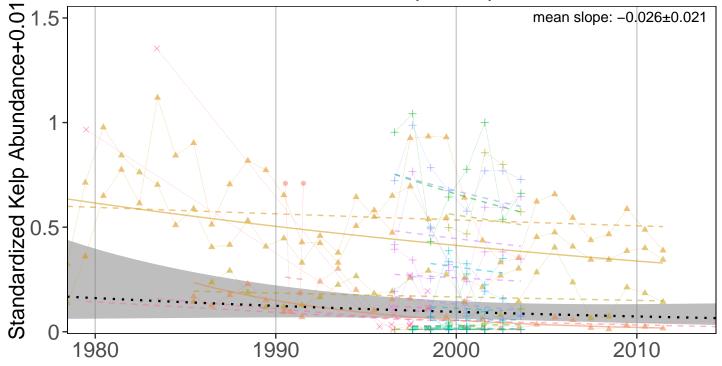


Study
Dean\_etal\_2000 A konar\_GulfOfAlaska



Dean\_etal\_2000 A konar\_GulfOfAlaska

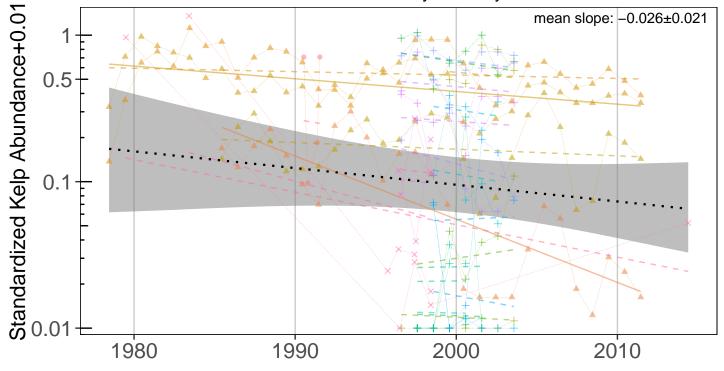
## Gulf of Maine/Bay of Fundy



## Study

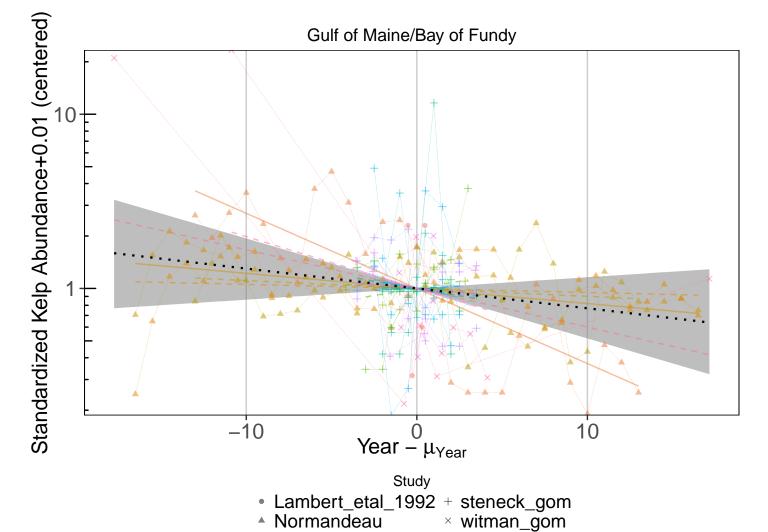
- Lambert\_etal\_1992 + steneck\_gom
- Normandeau × witman\_gom

## Gulf of Maine/Bay of Fundy

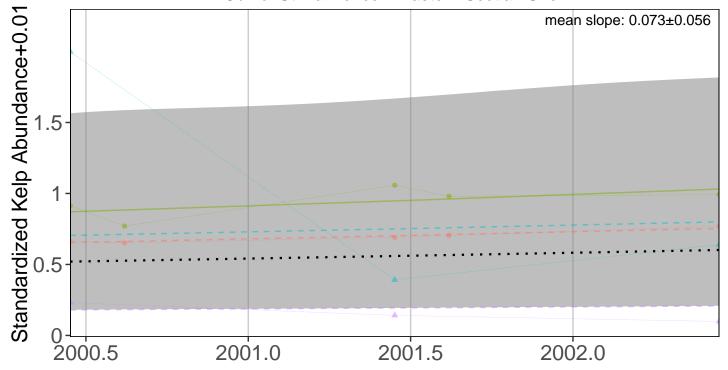


## Study

- Lambert\_etal\_1992 + steneck\_gom
- ▲ Normandeau × witman\_gom

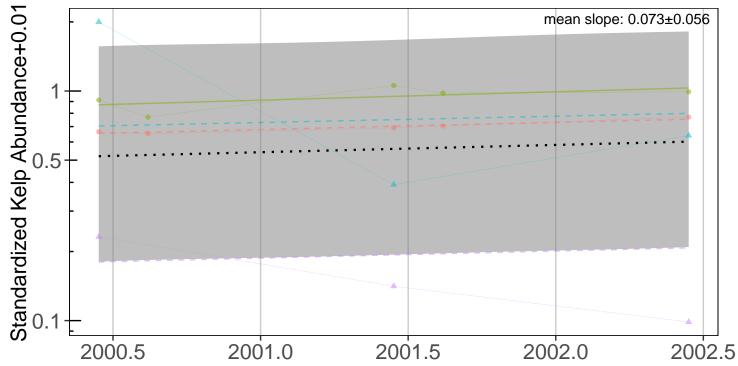


#### Gulf of St. Lawrence - Eastern Scotian Shelf

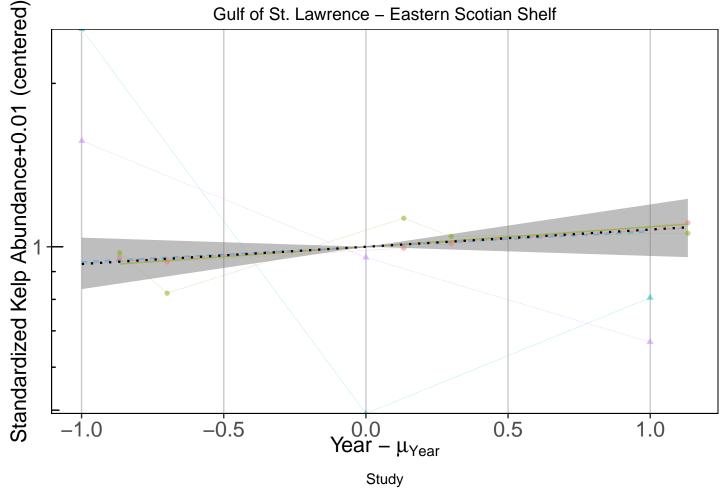


Study
Gagnon\_atal\_2005 A Gagnon\_etal\_2004

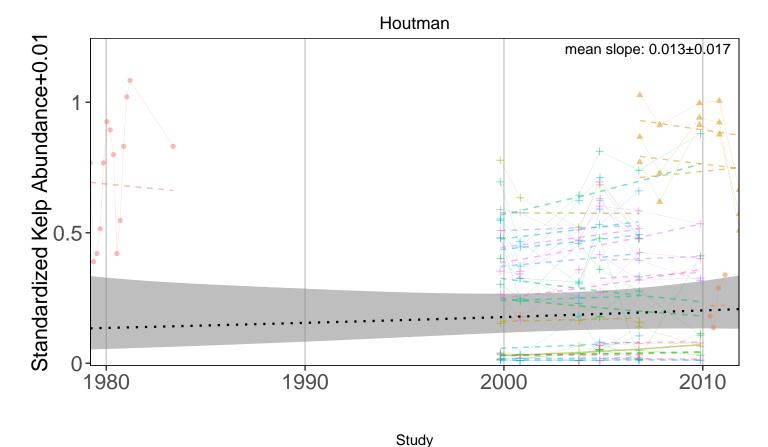
#### Gulf of St. Lawrence - Eastern Scotian Shelf



Study
Gagnon\_atal\_2005 A Gagnon\_etal\_2004



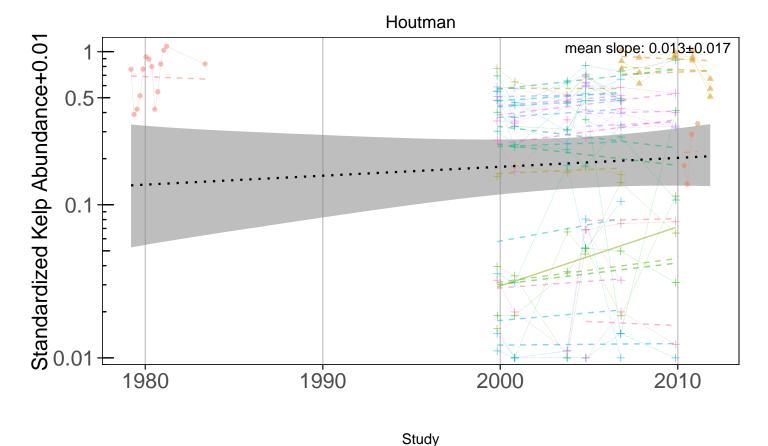
• Gagnon\_atal\_2005 A Gagnon\_etal\_2004



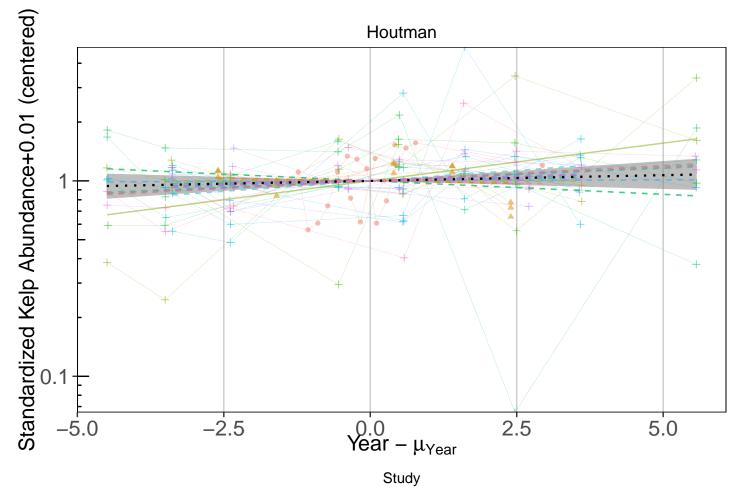
Aus\_Marmion

Australia\_WA\_Wernberg

+ KelpCover\_Temperate\_Australia



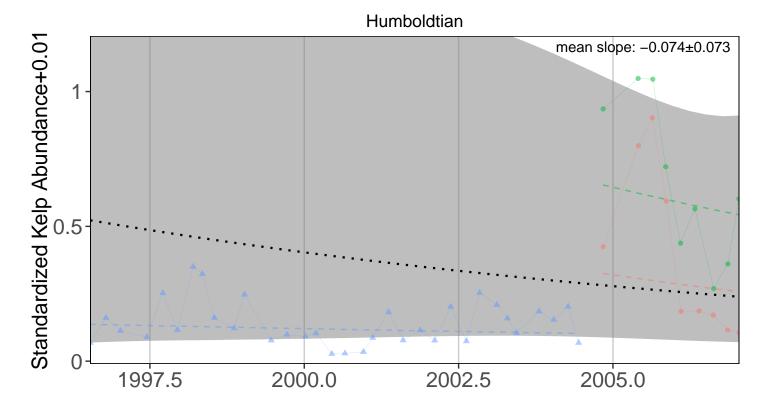
- Aus\_Marmion
- Australia\_WA\_Wernberg
- + KelpCover\_Temperate\_Australia



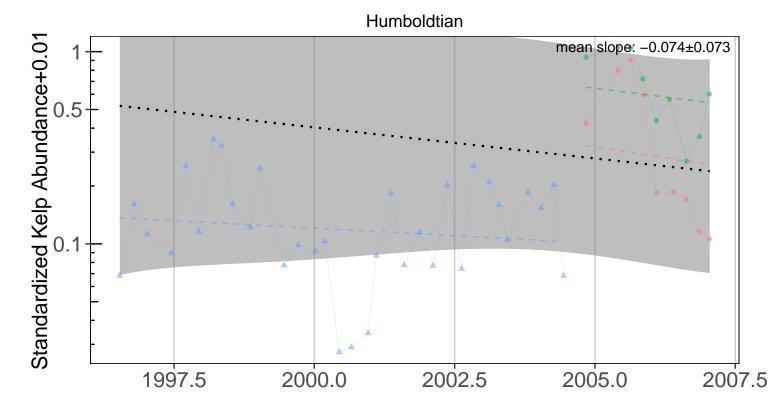
Aus\_Marmion

Australia\_WA\_Wernberg

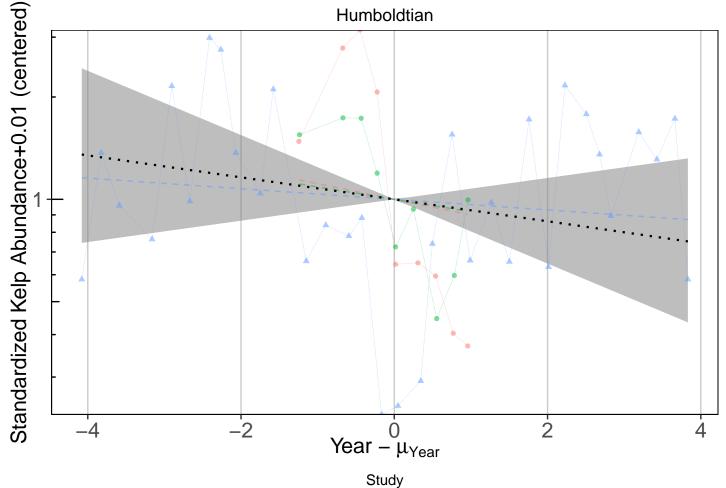
+ KelpCover\_Temperate\_Australia



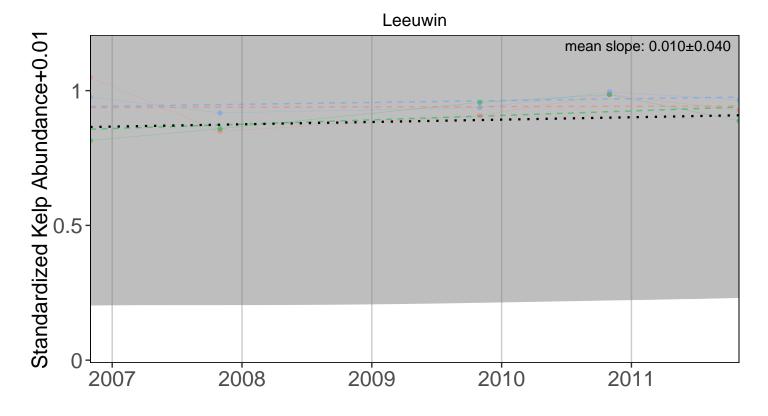
Study
• Northern\_Chile • Vasquez\_etal\_2006



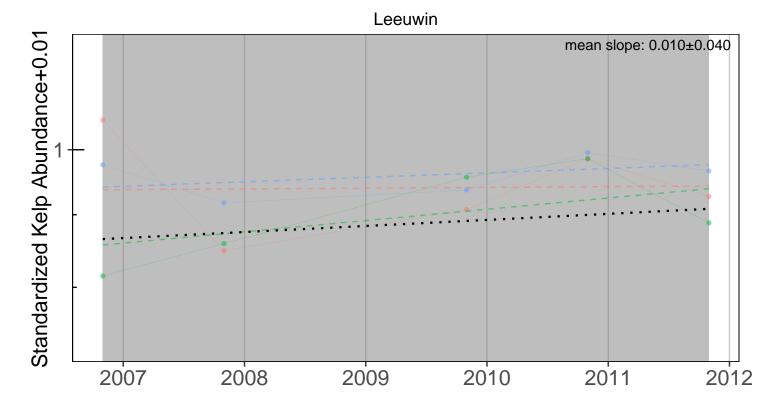
Study
• Northern\_Chile • Vasquez\_etal\_2006



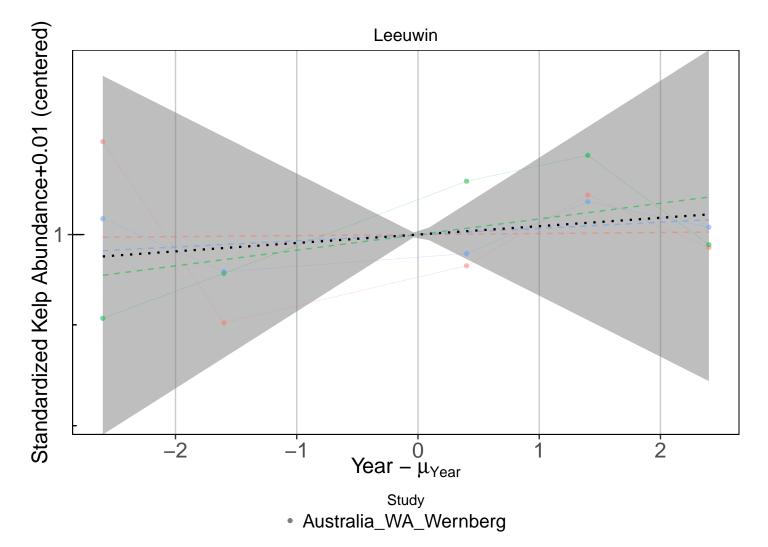
Northern\_Chile A Vasquez\_etal\_2006

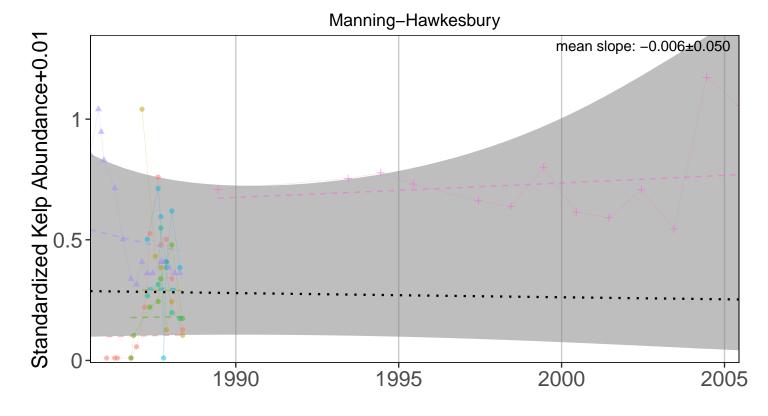


Study
• Australia\_WA\_Wernberg



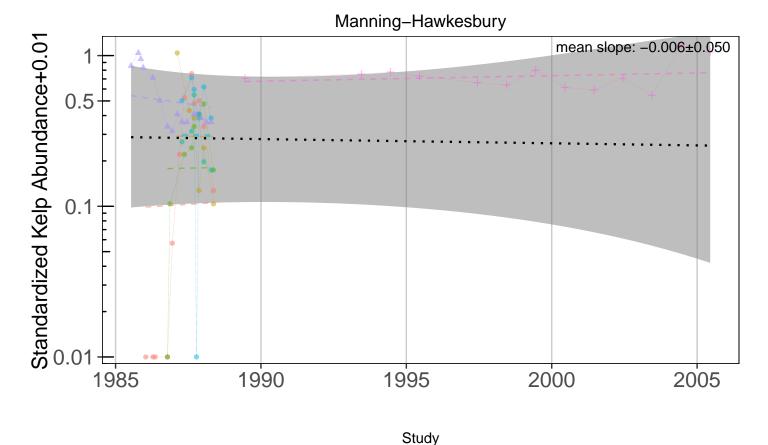
Study
• Australia\_WA\_Wernberg



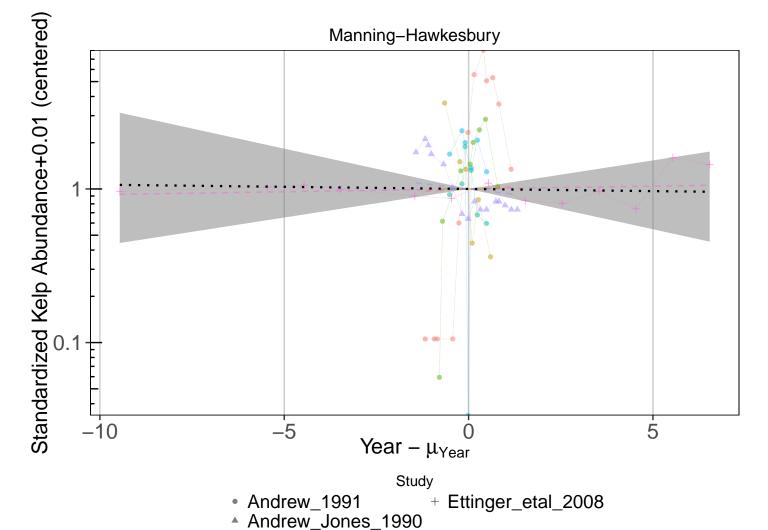


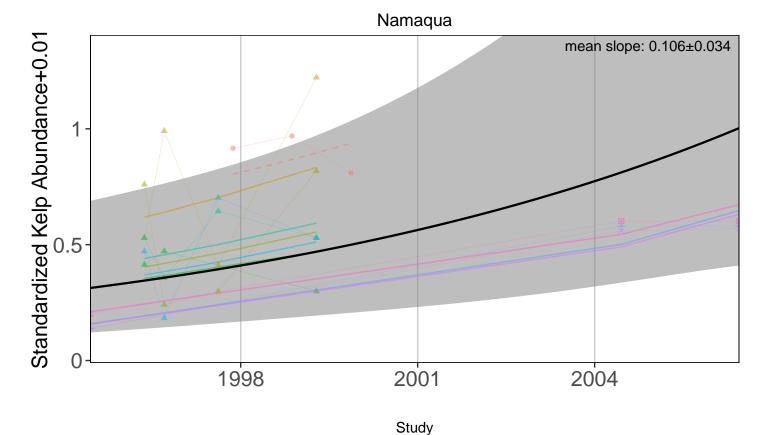
• Andrew\_1991 + Ettinger\_etal\_2008

Andrew\_Jones\_1990



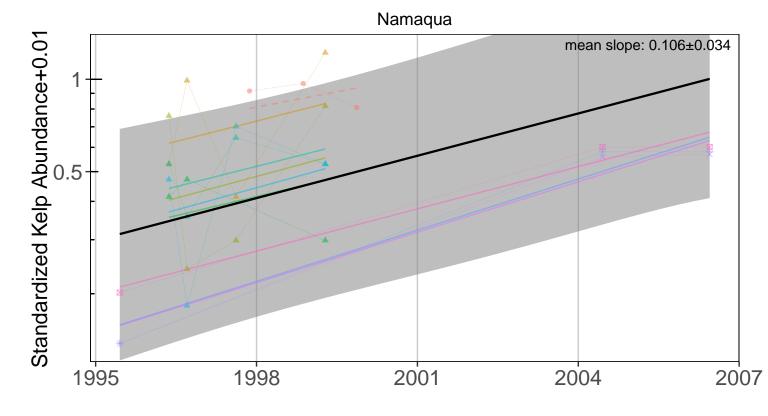
Andrew\_1991 + Ettinger\_etal\_2008
Andrew\_Jones\_1990





# Anderson\_etal\_ 2006

- Pulfrich\_etal\_2003
- + South\_Africa\_Kwaaibaii
- × South\_Africa\_Mauritzbaai
- South\_Africa\_Pump\_House



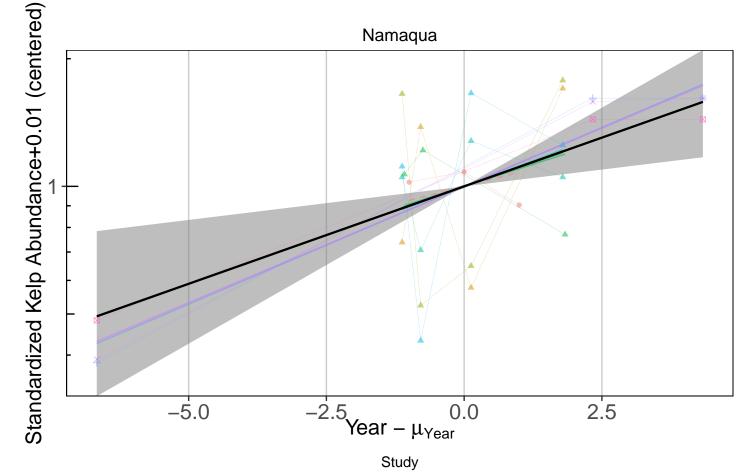
Anderson\_etal\_ 2006

Pulfrich\_etal\_2003

+ South\_Africa\_Kwaaibaii

Study
× South\_Africa\_Mauritzbaai

■ South\_Africa\_Pump\_House

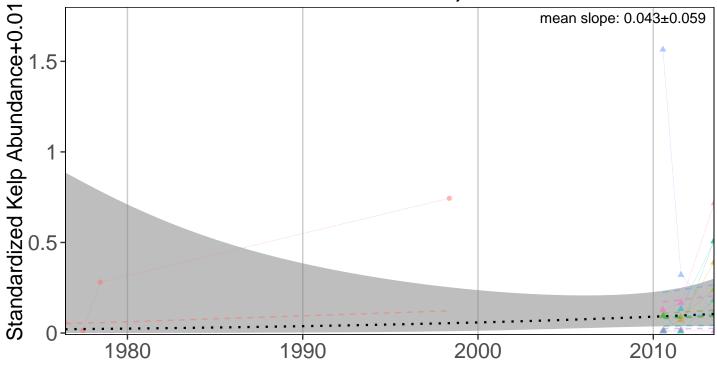


Anderson\_etal\_ 2006

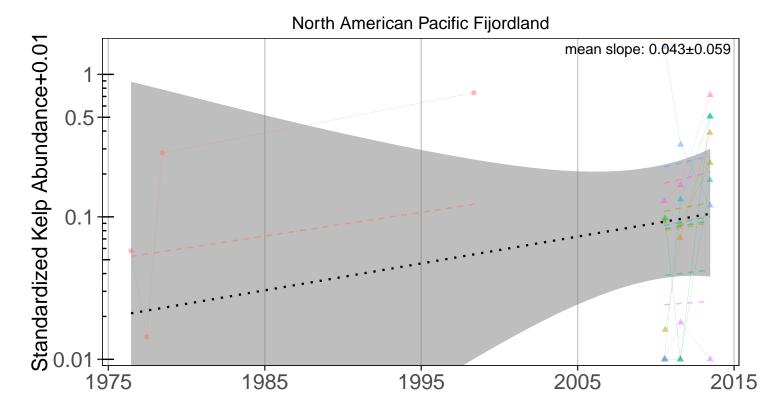
× South\_Africa\_Mauritzbaai ▲ Pulfrich\_etal\_2003 South\_Africa\_Pump\_House

+ South\_Africa\_Kwaaibaii

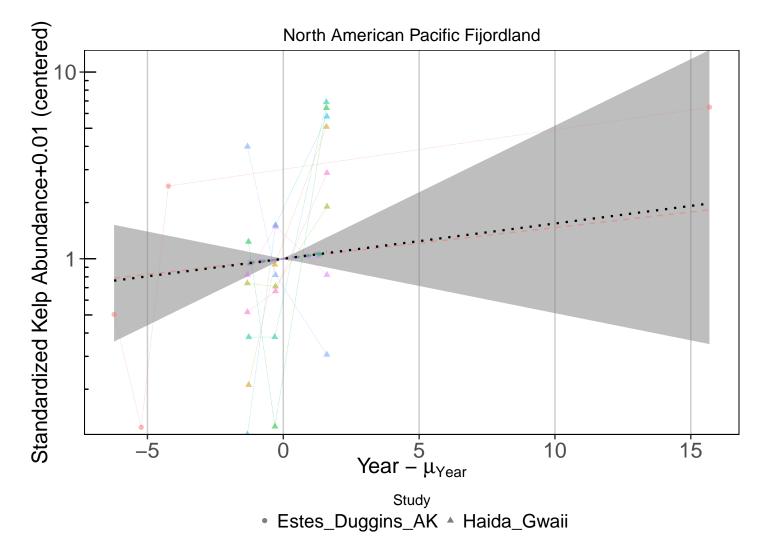
# North American Pacific Fijordland



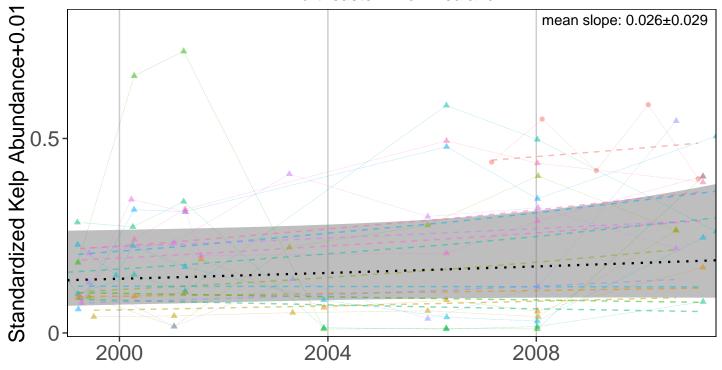
Study
• Estes\_Duggins\_AK • Haida\_Gwaii



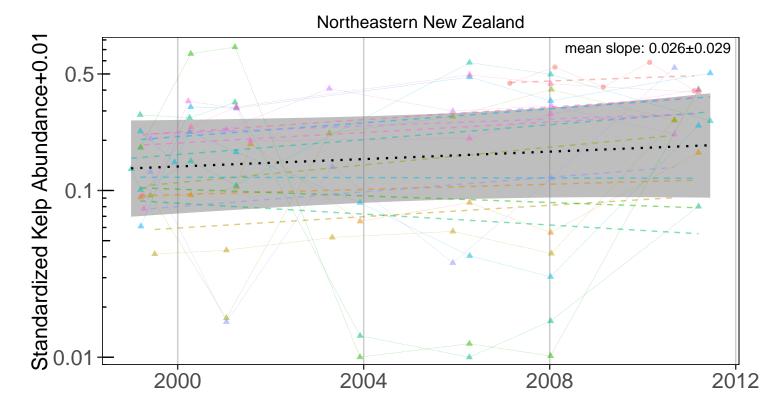
Study
• Estes\_Duggins\_AK • Haida\_Gwaii



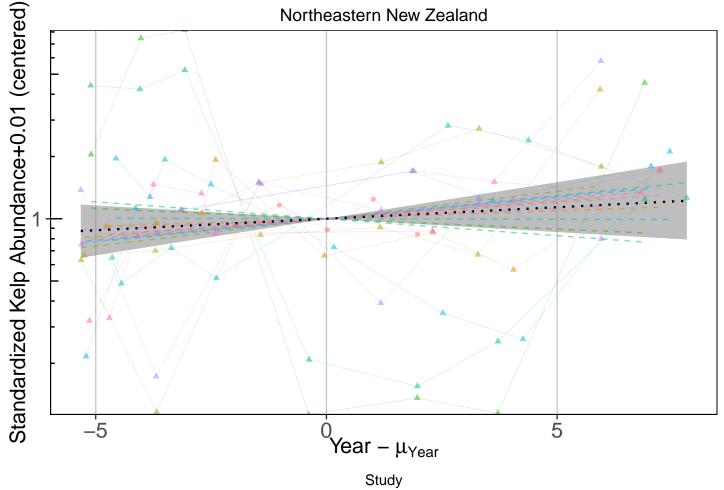
#### Northeastern New Zealand



Study
• New\_Zealand\_Hauraki\_Gulf • Northern\_New\_Zealand

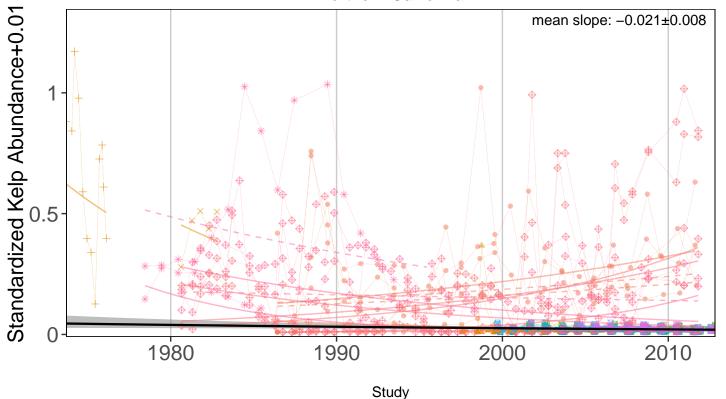


Study
• New\_Zealand\_Hauraki\_Gulf • Northern\_New\_Zealand



New\_Zealand\_Hauraki\_Gulf
 Northern\_New\_Zealand

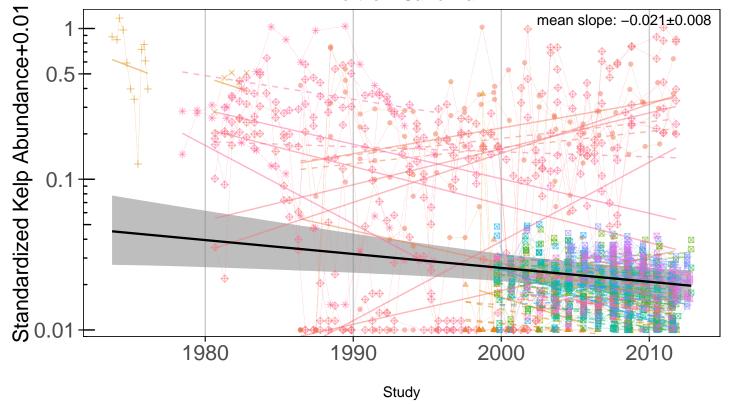
#### Northern California



- Channel\_Islands\_National\_Park 

  PISCO\_subtidal
- ▲ Edwards\_baja \* Schiel\_etal\_2004
- × Harrold\_Reed\_1985

#### Northern California



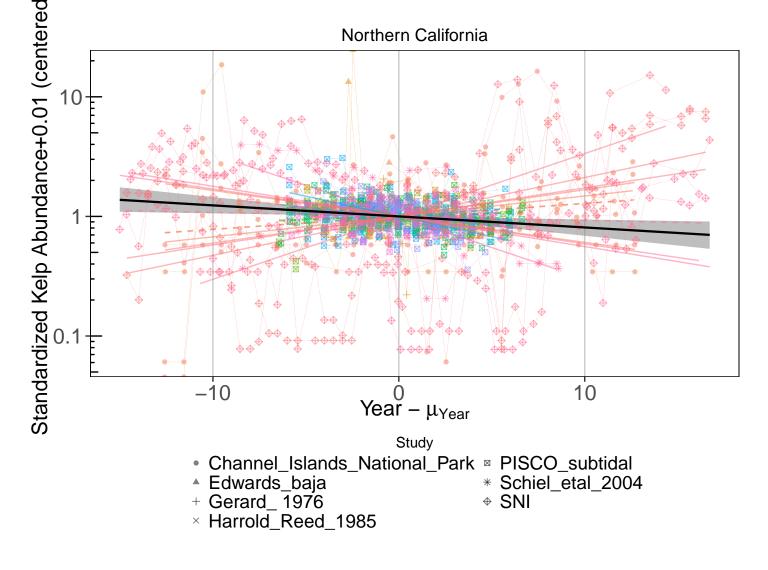
- Channel\_Islands\_National\_Park PISCO\_subtidal
- Edwards\_baja

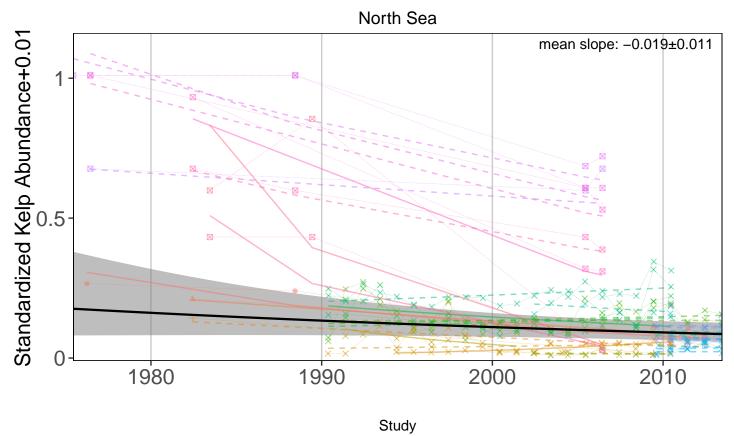
Schiel\_etal\_2004

Gerard\_ 1976

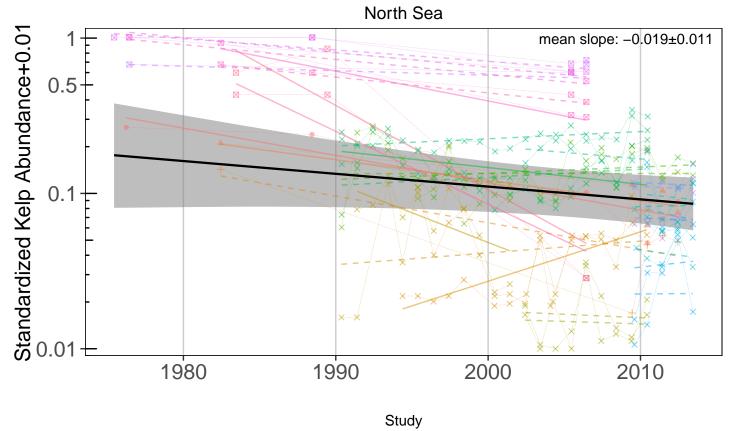
SNI

Harrold\_Reed\_1985

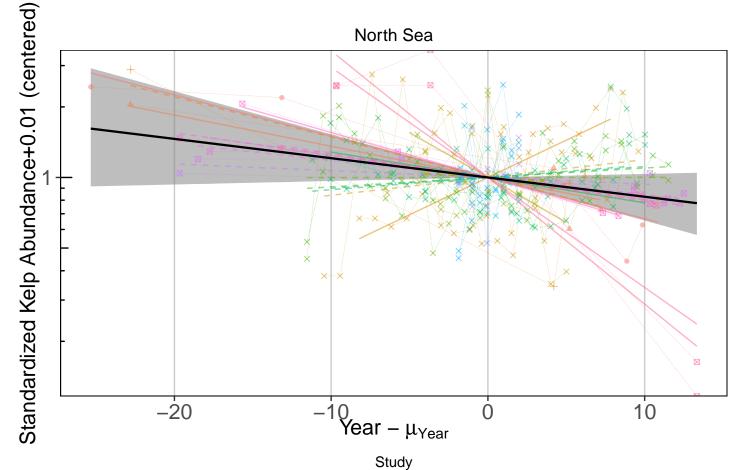




- norway\_inner\_coast\_norderhaug-Ei × Norway\_monitoring\_kelp\_data
- norway\_inner\_coast\_norderhaug-Gr norway\_moy\_christie\_with\_Asen\_2
- + norway\_inner\_coast\_norderhaug-No

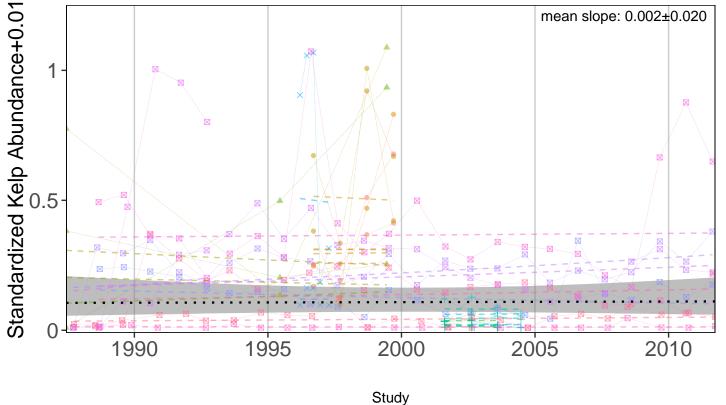


- norway\_inner\_coast\_norderhaug-Ei × Norway\_monitoring\_kelp\_data
- norway\_inner\_coast\_norderhaug-Gr □ norway\_moy\_christie\_with\_Åsen\_2
- + norway\_inner\_coast\_norderhaug-No



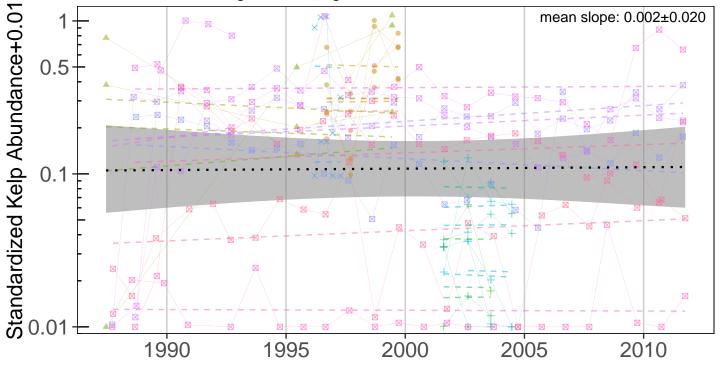
- norway\_inner\_coast\_norderhaug-Ei × Norway\_monitoring\_kelp\_data
- ▲ norway\_inner\_coast\_norderhaug-Gr ⋈ norway\_moy\_christie\_with\_åsen\_2
- + norway\_inner\_coast\_norderhaug-No

# Oregon, Washington, Vancouver Coast and Shelf



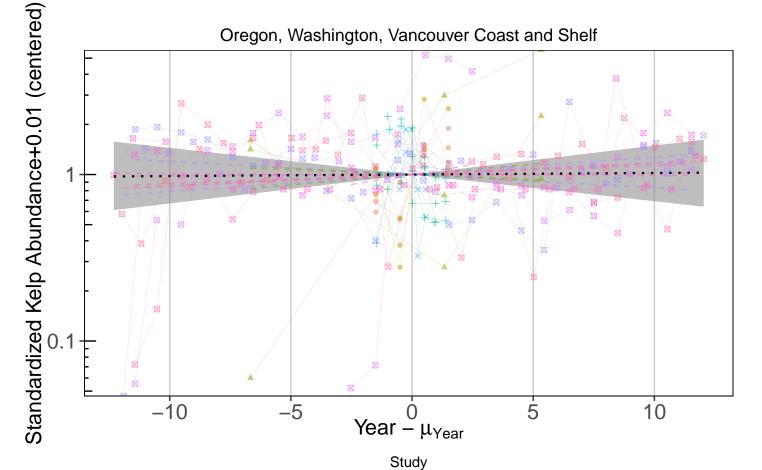
- Fox\_etal\_1999 × Shaffer\_2000
- ▲ Kvitek\_etal\_ 2001 ☑ VancouverIsland-JaneWatson
- + PISCO\_oregon

# Oregon, Washington, Vancouver Coast and Shelf



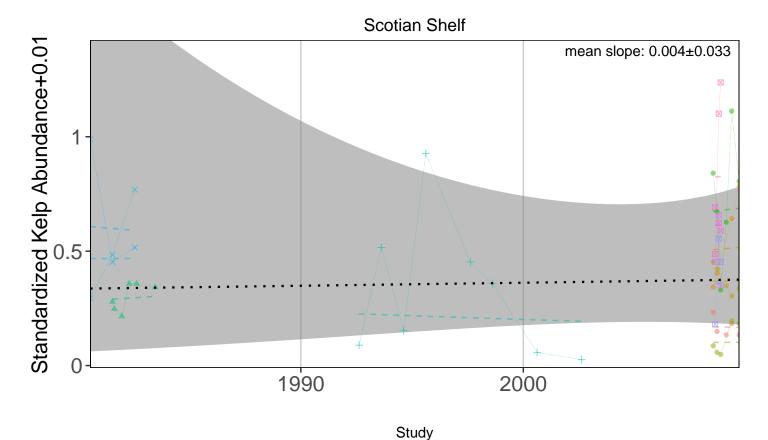
- Fox\_etal\_1999 × Shaffer\_2000
- ▲ Kvitek\_etal\_ 2001 

  VancouverIsland-JaneWatson
- + PISCO\_oregon



- Fox\_etal\_1999 × Shaffer\_2000
- ▲ Kvitek\_etal\_ 2001 

  VancouverIsland-JaneWatson
- + PISCO\_oregon

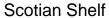


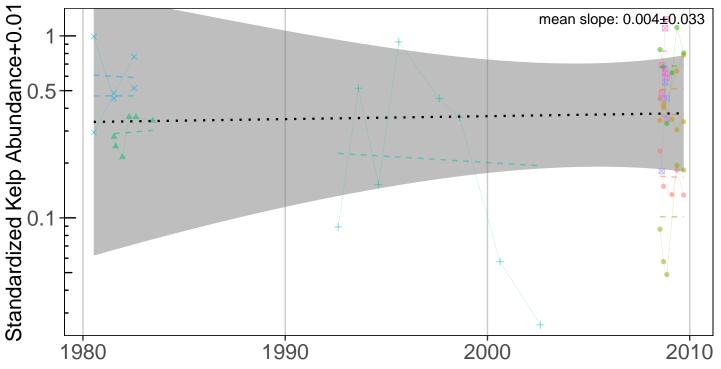
Krumhansl & Scheibling (2011)

Miller (1985)+ Scheibling & Gagnon 2009, Kelly

Smith\_ 1985

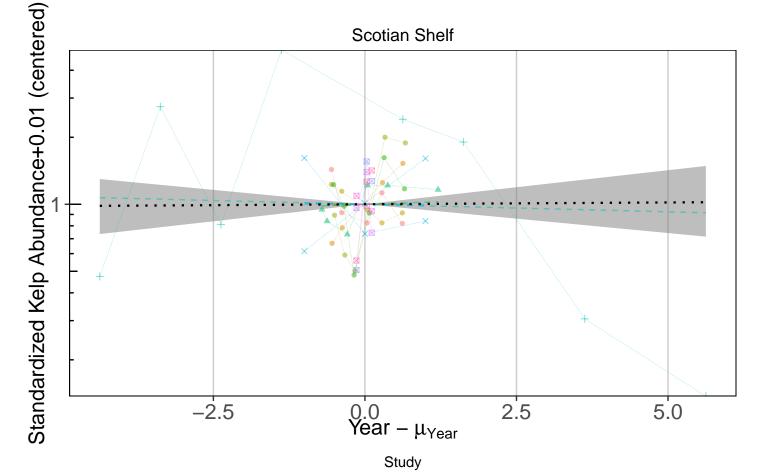
Yorke & Metaxas 2012





Study

- Krumhansl & Scheibling (2011)
- Miller (1985)Scheibling & Gagnon 2009, Kelly
- Smith\_ 1985
- Yorke & Metaxas 2012

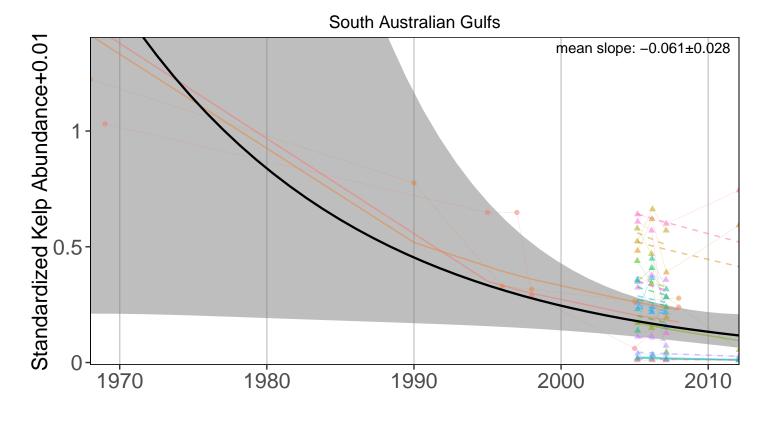


Krumhansl & Scheibling (2011)

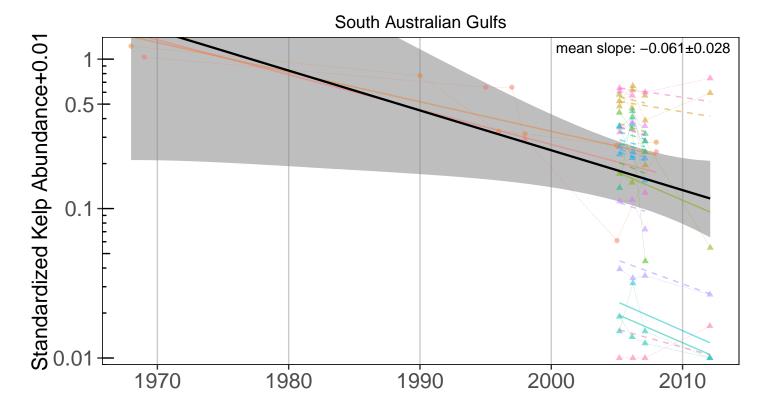
Miller (1985)

+ Scheibling & Gagnon 2009, Kelly

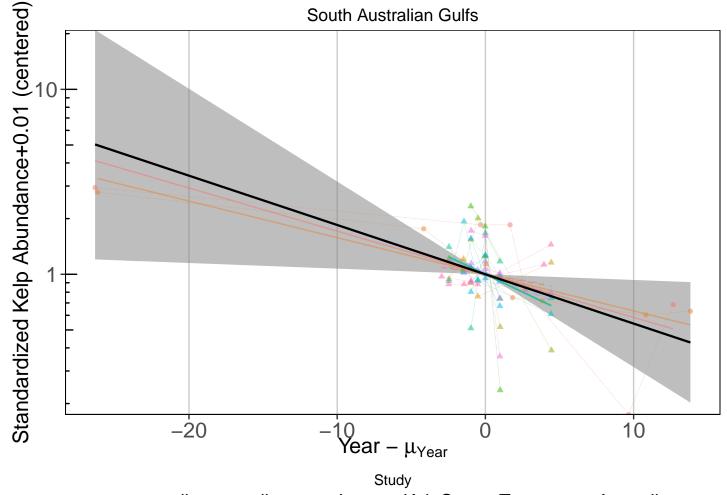
× Smith\_ 1985 ✓ Yorke & Metaxas 2012



Study
• autralia\_connell\_canopyLoss • KelpCover\_Temperate\_Australia

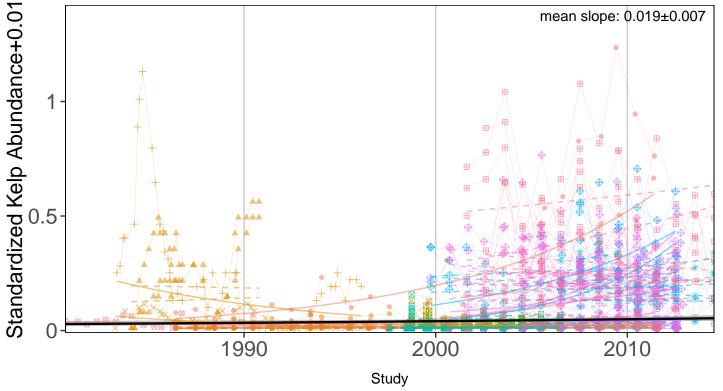


Study
• autralia\_connell\_canopyLoss • KelpCover\_Temperate\_Australia



autralia\_connell\_canopyLoss \* KelpCover\_Temperate\_Australia

### Southern California Bight

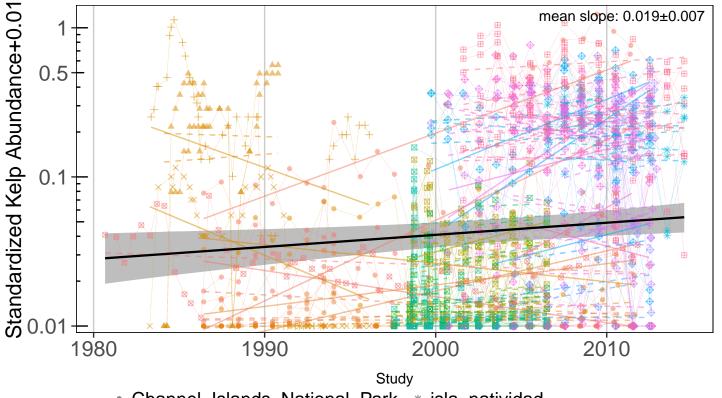


- Channel\_Islands\_National\_Park \* isla\_natividad
- ▲ Dayton\_etal\_1992 

  ◆ PISCO\_subtidal
- + Dayton\_etal\_1999\_Laminaria 

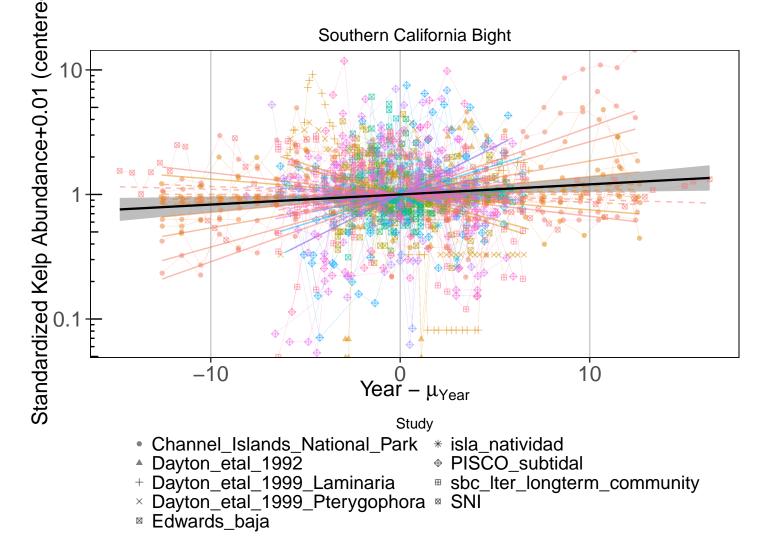
  \*\*sbc\_lter\_longterm\_community\*
- × Dayton\_etal\_1999\_Pterygophora ∞ SNI
- Edwards\_baja

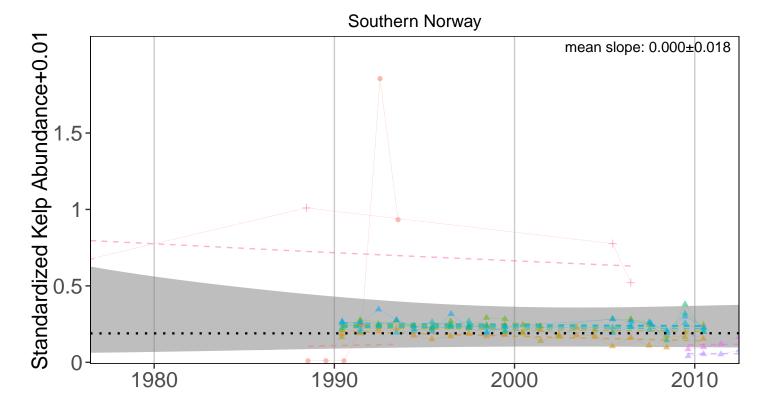
### Southern California Bight



- Channel\_Islands\_National\_Park \* isla\_natividad
- ▲ Dayton\_etal\_1992 

  ◆ PISCO\_subtidal
- × Dayton\_etal\_1999\_Pterygophora ∞ SNI
- Edwards\_baja

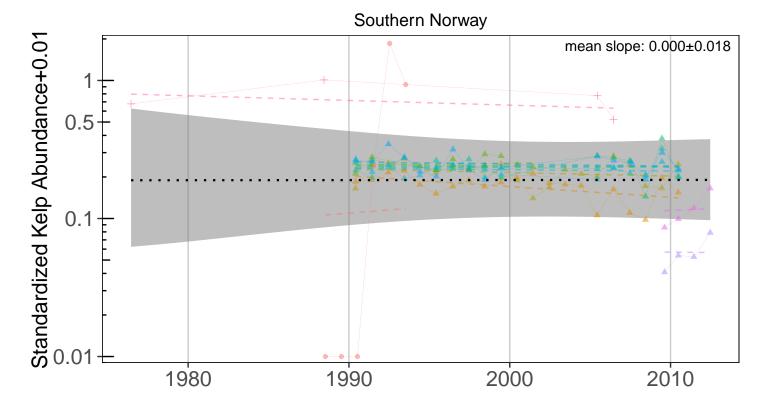




Study

• Leinaas\_Christie\_1996 + norway\_moy\_christie\_with\_Åsen\_2

• Norway\_monitoring\_kelp\_data

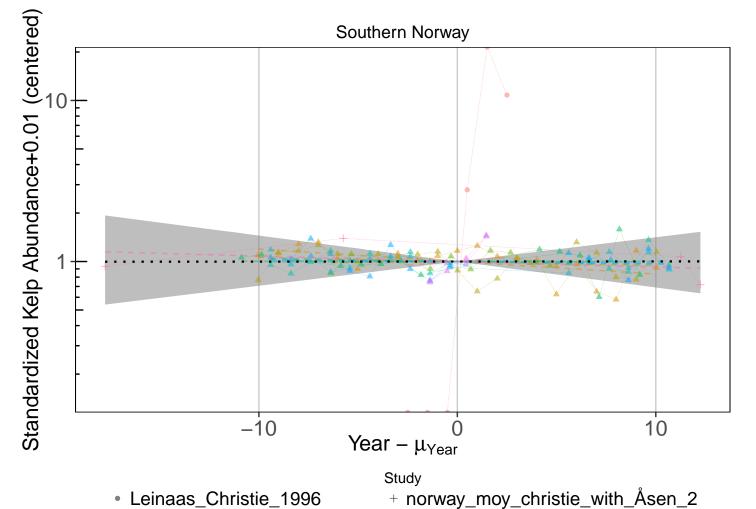


Leinaas\_Christie\_1996

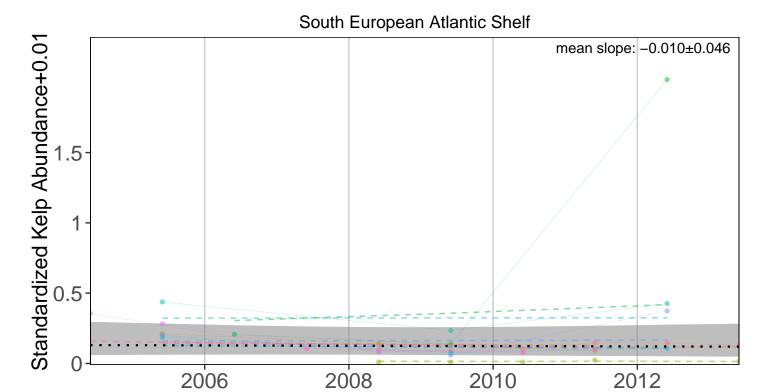
+ norway\_moy\_christie\_with\_Asen\_2

Study

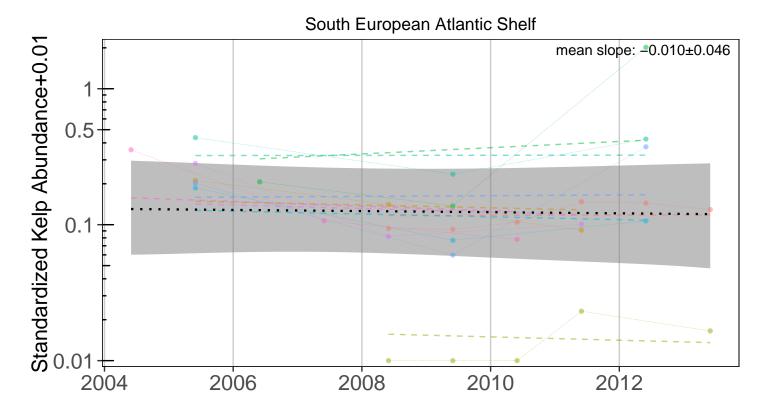
Norway\_monitoring\_kelp\_data



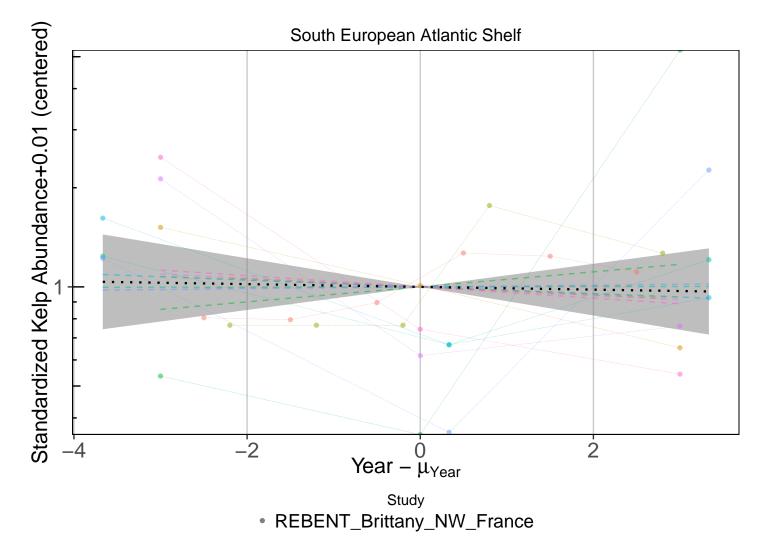
Norway\_monitoring\_kelp\_data

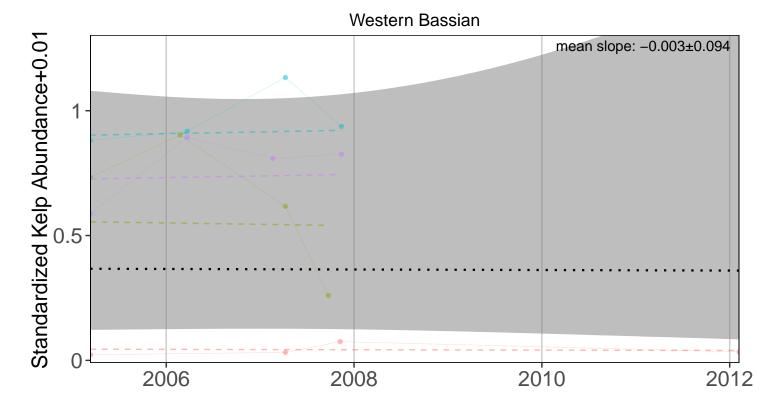


Study
• REBENT\_Brittany\_NW\_France

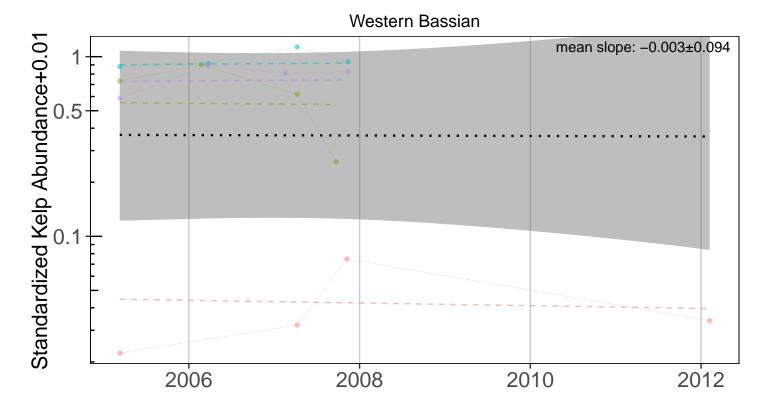


Study
• REBENT\_Brittany\_NW\_France

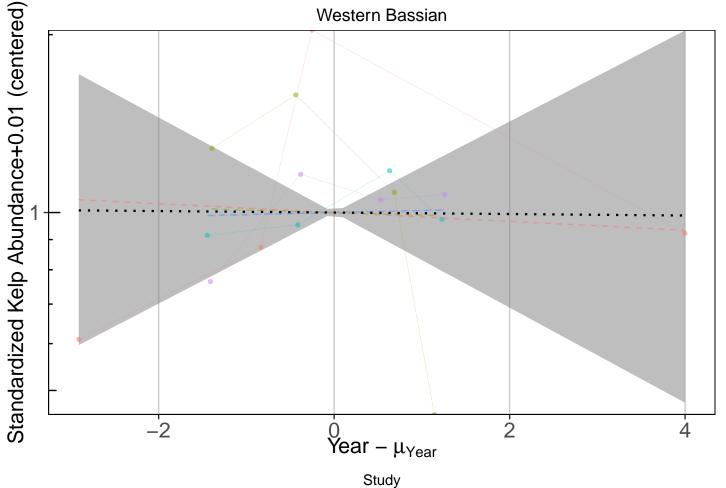




Study
• KelpCover\_Temperate\_Australia



Study
• KelpCover\_Temperate\_Australia



KelpCover\_Temperate\_Australia