Ch 3 thoughts…

To what extent do salinity and total alkalinity impact growth in juvenile *Crassotrea virginica* oysters?

Figure 1: comparison of average, 5-week growth at ambient [TA] in ambient versus reduced salinity exposure (34 vs 27)

Figure 2: comparison of average, 5-week growth at ambient S (34) across varying [TA] (reduced, ambient, elevated)

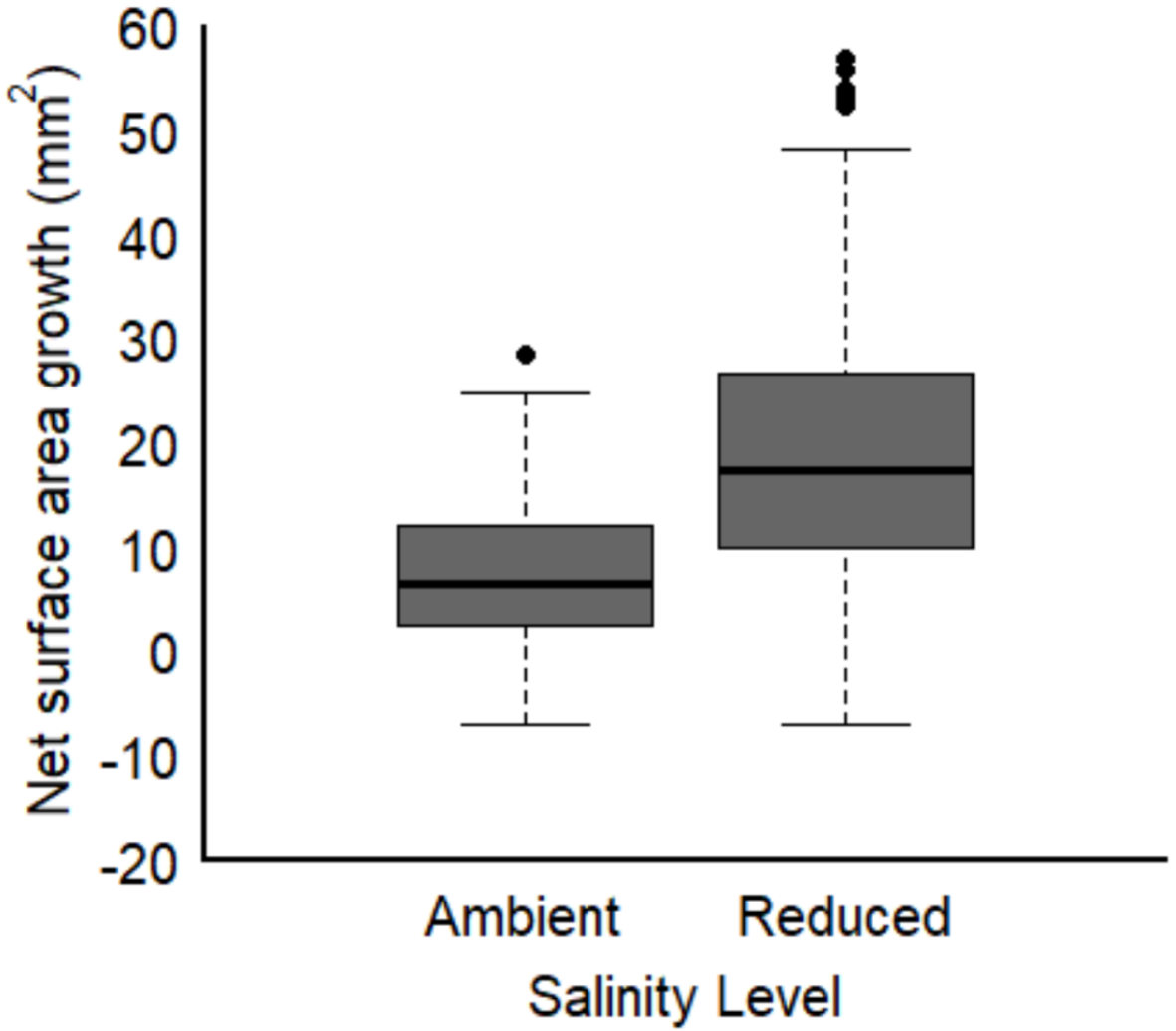

Figure 1: comparison of average, 5-week growth at ambient [TA] in ambient versus reduced salinity exposure (34 vs 27)

Oysters exposed to reduced salinity conditions had **higher** net growth rates than those exposed to ambient salinity

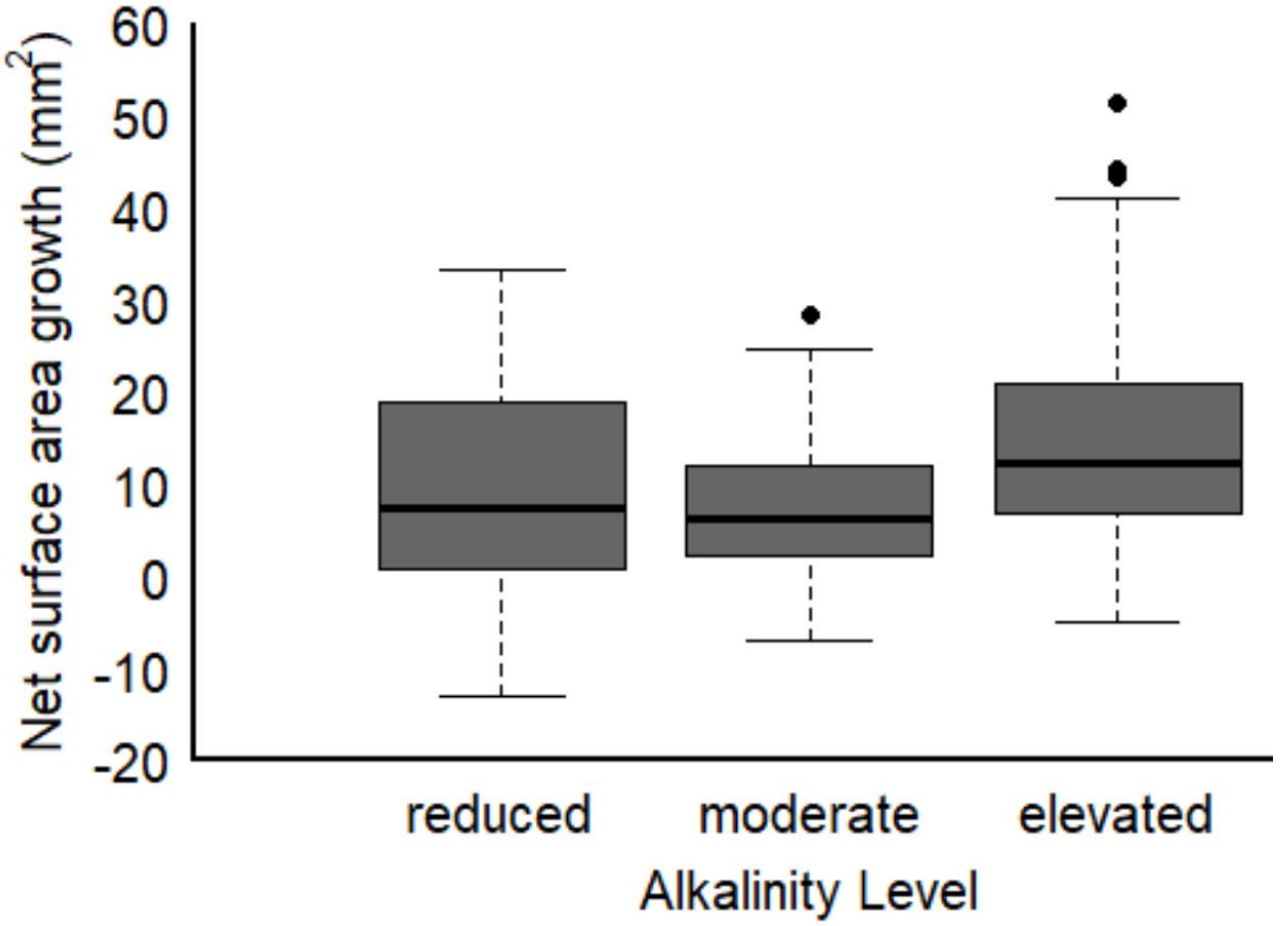

Figure 2: comparison of average, 5-week growth at ambient S (34) across varying [TA] (reduced, ambient, elevated)

Oysters exposed to elevated alkalinity had **higher** net growth than those in ambient and reduced alkalinity treatments.

To what extent does the total alkalinity of the freshwater source impact growth of juvenile *Crassotrea virginica* oysters exposed to low salinity conditions?

Figure 3: comparison of average, 5-week growth in conditions when reduced salinity is simulated as: (i) rainfall, (ii) low TA freshwater source, (iii) high TA freshwater source

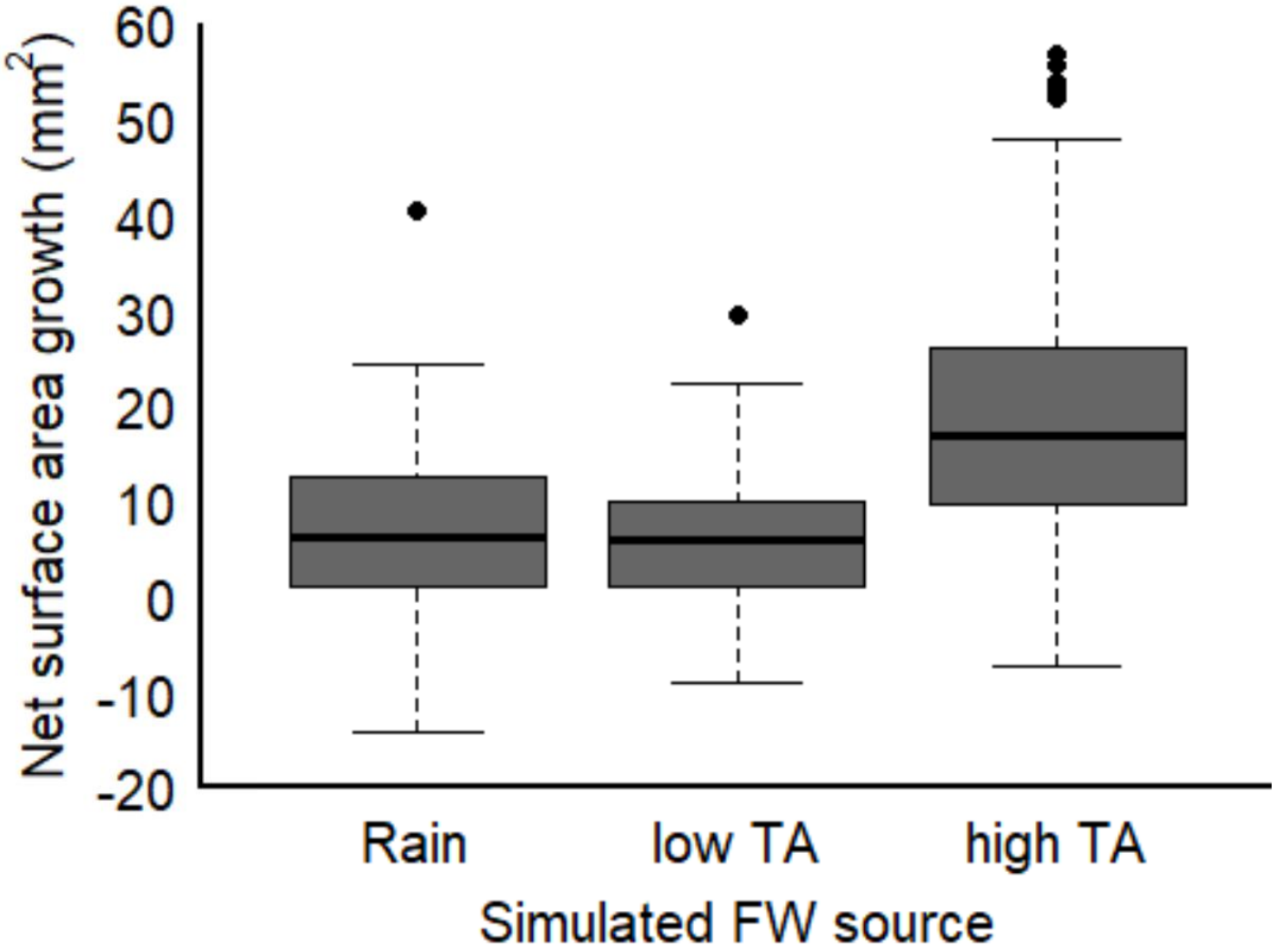

Figure 3: comparison of average, 5-week growth in conditions when reduced salinity is simulated as: (i) rainfall, (ii) low TA freshwater source, (iii) high TA freshwater source

We did not detect a difference in net growth between oysters exposed to treatments diluted with DI and those exposed to conditions imitating exposure to freshwater with low alkalinity signature. However, **net growth** was **higher** in conditions simulating exposure to freshwater with **elevated alkalinity**

Do we detect ‘shock’ growth responses in juvenile *Crassotrea virginica* oysters?

Figure 4: comparison of incremental growth rates (mm2/day) from the first two weeks of exposure and the last three weeks of exposure along a gradient of [TA] in ambient salinity

Figure 5: comparison of incremental growth rates (mm2/day) from the first two weeks of exposure and the last three weeks of exposure to salinity reduced by three hypothetical scenarios (rainfall, low TA stream, high TA stream)

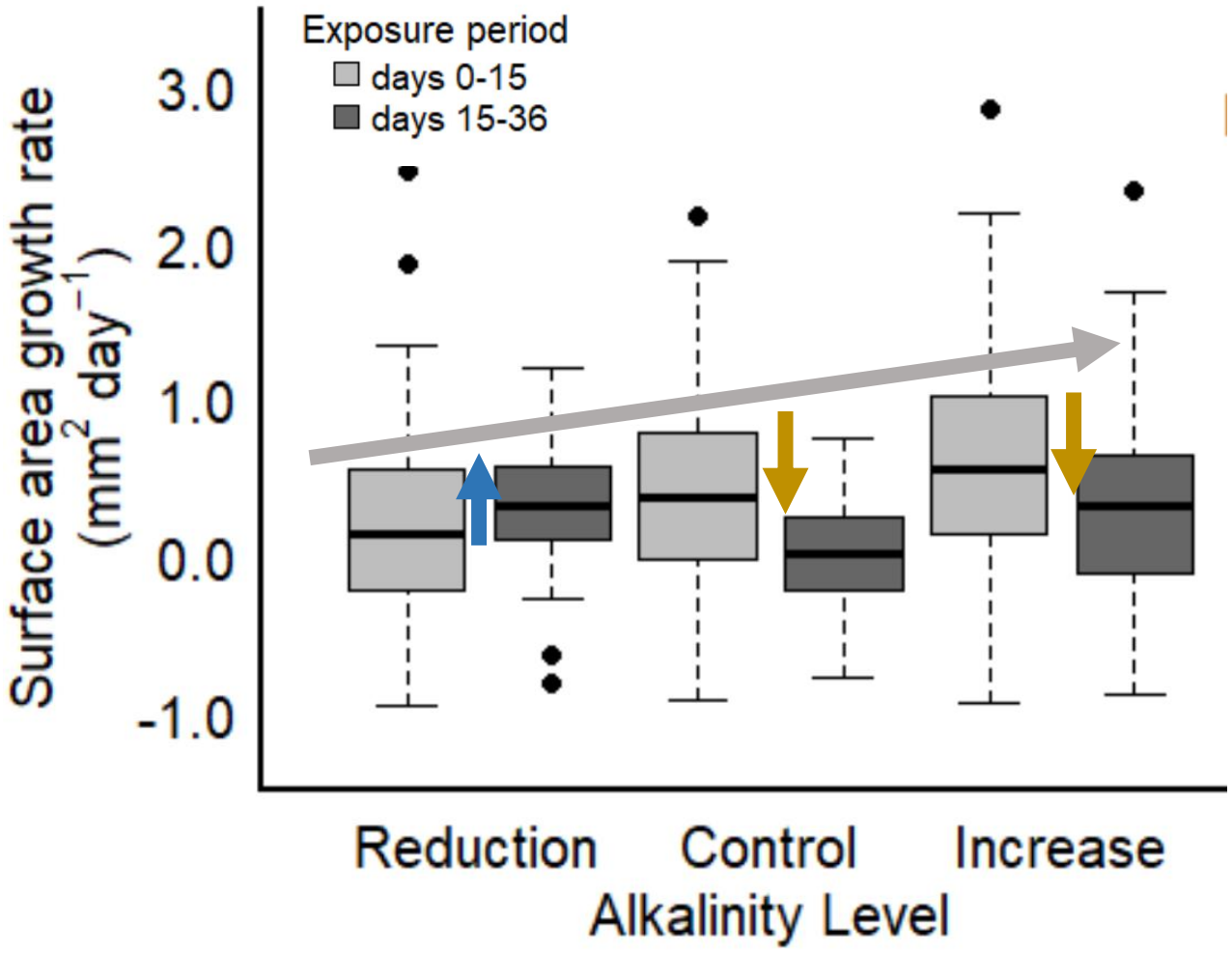

Figure 4: comparison of incremental growth rates (mm2/day) from the first two weeks of exposure and the last three weeks of exposure along a gradient of [TA] in ambient salinity

Oyster growth rates had a positive relationship with [TA] over the first two weeks.

Only in treatments with reduced [TA] did we see an increase in incremental growth after two weeks.

Incremental growth slowed down in ambient and elevated TA conditions beyond two weeks of exposure

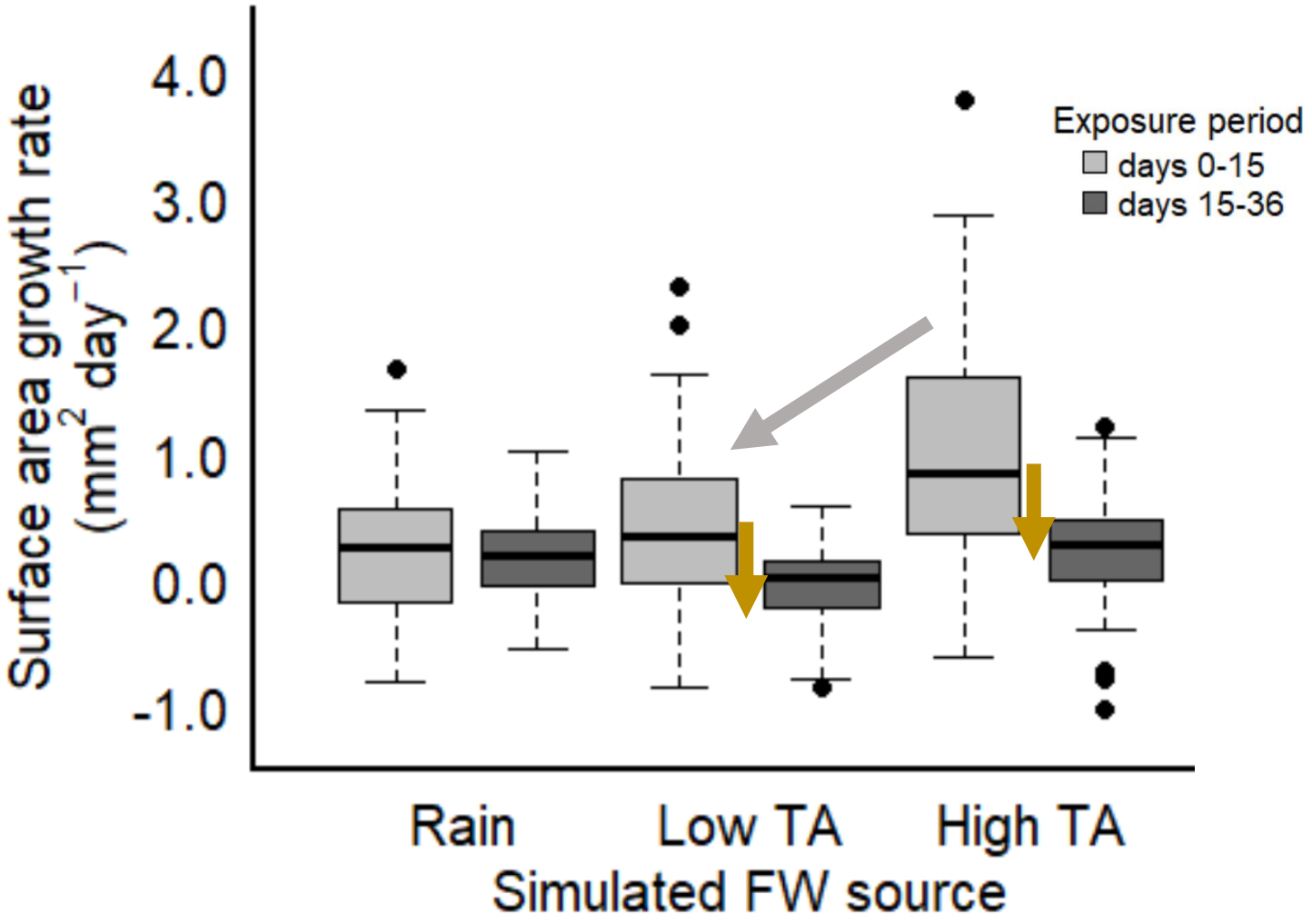

Figure 5: comparison of incremental growth rates (mm2/day) from the first two weeks of exposure and the last three weeks of exposure to salinity reduced by three hypothetical scenarios (rainfall, low TA stream, high TA stream)

There is a strong effect of high TA on incremental growth rate within the first two weeks.

This effect is persistent, thus, not a 'shock effect', however, it does appear to weaken through time

Thus, the added effect of increased alkalinity under low salinity conditions may be most beneficial for immediately upon exposure to low S conditions.

To what extent do modified S and TA impact overall C allocation?

Figure 6: comparison of the organic content found in the shell and CI between high and low salinities (at ambient [TA])

Figure 7: comparison of the organic content found in the shell and CI along a gradient of [TA] at ambient salinity

Figure 8: comparison of the organic content found in the shell and CI along a gradient of simulated FW exposure levels

Low salinity did not influence % OC in shell, but did reduce condition index

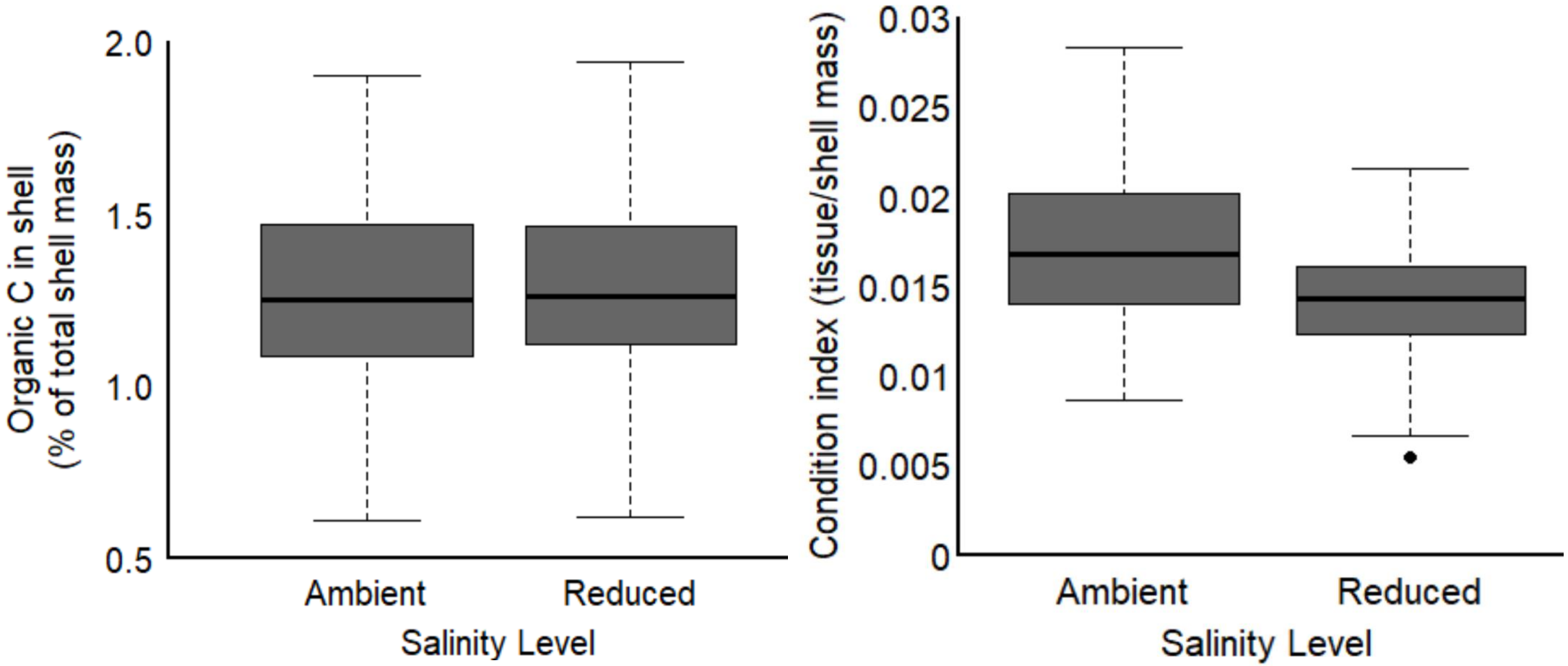

Figure 6: comparison of the organic content found in the shell and CI between high and low salinities (at ambient [TA])

[TA] weakly impacted % OC in shell and condition index similarly

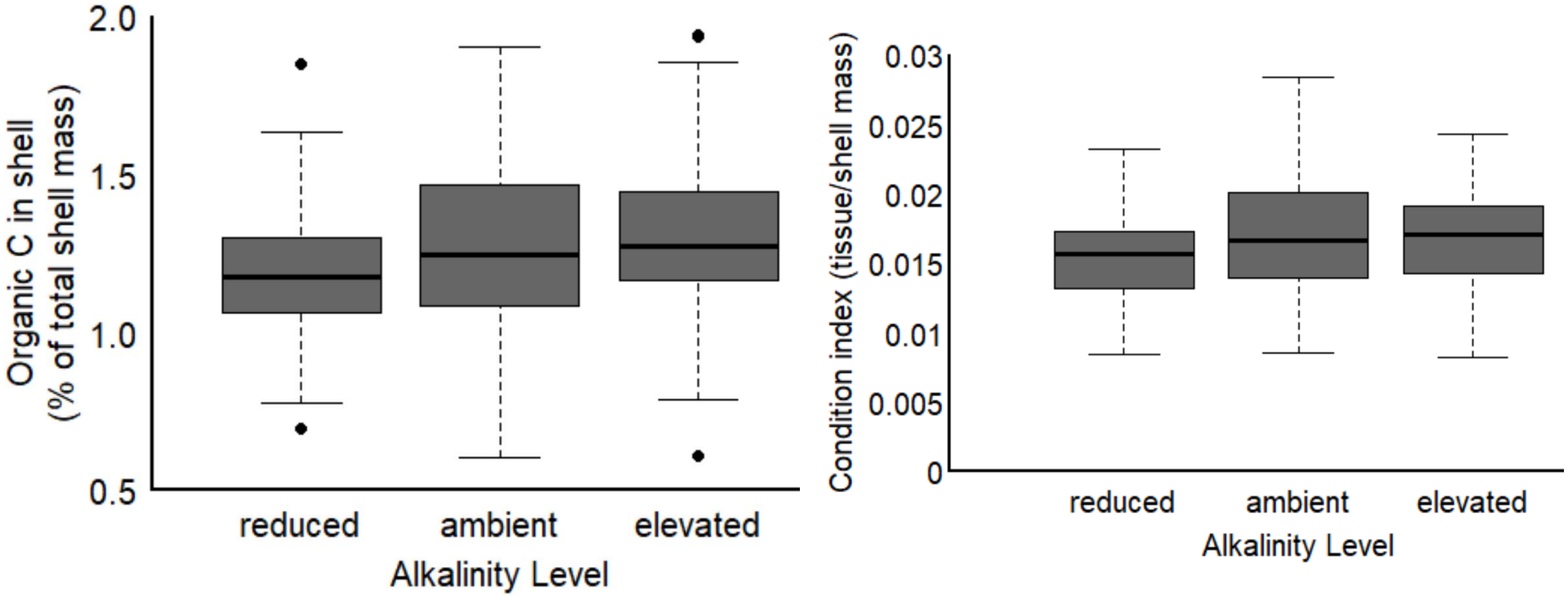

Figure 7: comparison of the organic content found in the shell and CI along a gradient of [TA] at ambient salinity

Altered [TA] did not impact %OC in shell, however, condition index was lowest in the rain and high [TA] simulation

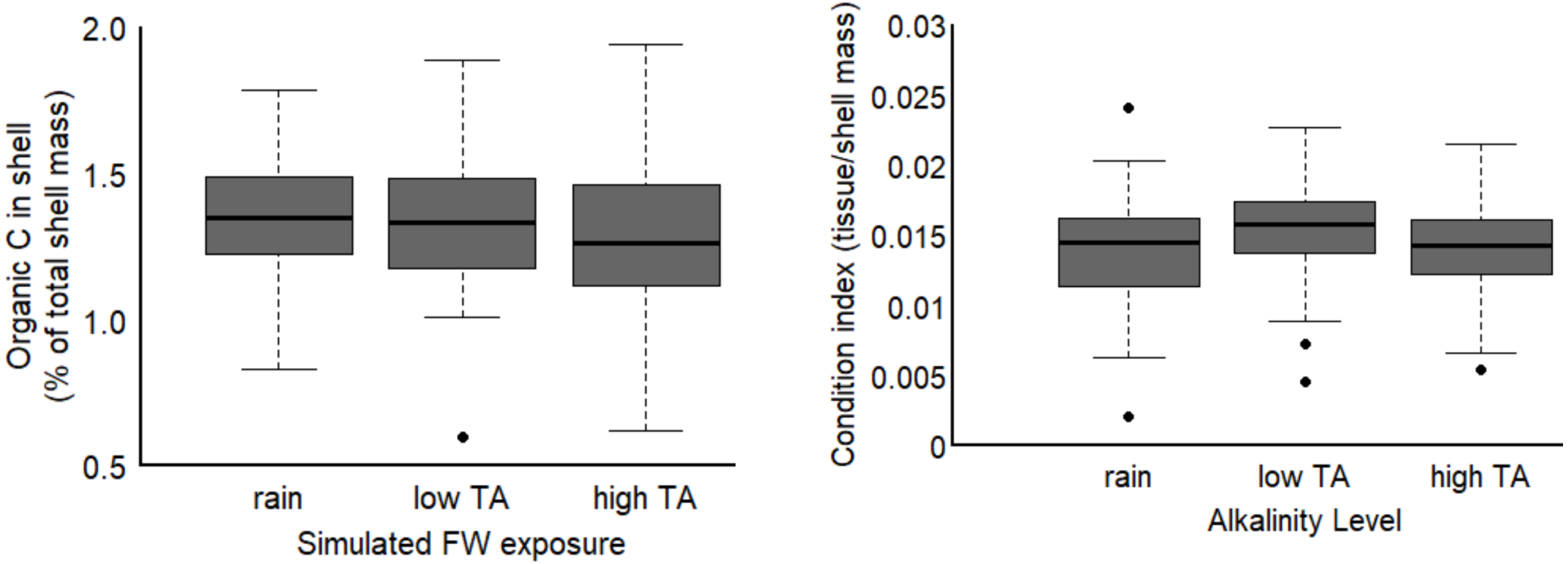

Figure 8: comparison of the organic content found in the shell and CI along a gradient of simulated FW exposure levels

What can we say when we put it all together?

1. Oyster growth was higher in low salinity conditions in amb [TA] (Fig 1)
    1. Oysters also had lower CI values in low salinity conditions; however %OC did not differ (Fig 6)
2. Oyster growth is elevated by increased total alkalinity above ambient seawater concentrations (Fig 2)
    1. Which was largely driven by high incremental growth in the first two weeks, with incremental growth declining between week 2-5 in the ambient and high TA conditions…(Fig 5)
    2. Ambient and elevated TA had similar CI and %OC in the shell, higher than low TA (Fig 7)
3. Oyster growth is maintained when alkalinity is severely reduced below ambient conditions (60% reduction) in ambient salinity(Fig 2)
    1. Which was largely driven by an increase in incremental growth *after* 2 weeks exposure to low TA conditions (Fig 5)
    2. Low TA exposure reduced the %OC and CI of oysters (Fig 7)
4. Oysters exposed to freshwater inputs that have elevated [TA], have higher growth than those exposed to rainfall/low TA rivers (Fig3)
    1. Which was largely driven by increased incremental growth in the first two weeks, with incremental growth declining between week 2-5…(Fig 5)
    2. We see no difference in %OC in the shell across the freshwater treatments (fig 8)
    3. Individuals from rain exposure and elevated FW TA had lower CI values (Fig 8); this matches the pattern of incremental growth at the later time point (Fig 5)