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Seasonal dynamics of oceanographic conditions, phytoplankton, and zooplankton in the Malaspina Strait, Strait of Georgia

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Speaker

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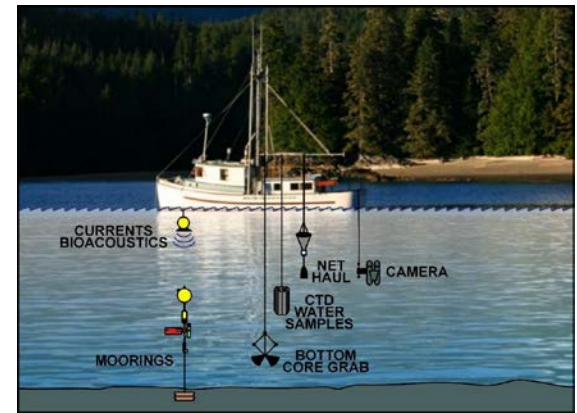
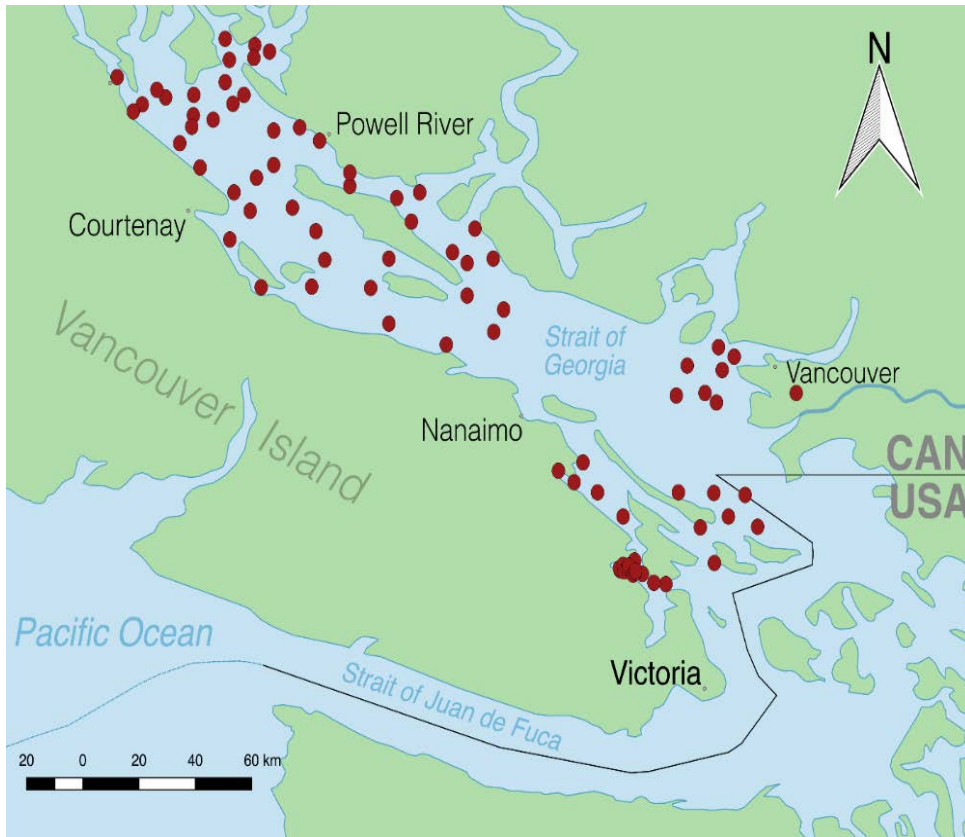
Seasonal dynamics of oceanographic conditions, phytoplankton, and zooplankton in the Malaspina Strait, Strait of Georgia

Svetlana Esenkulova¹, Karyn Suchy^{2,3}, R. Ian Perry^{3,4}, Kelly Young³, Maycira Costa², Ryan Flagg⁵, Moira Galbraith³, and Isobel Pearsall¹

¹Pacific Salmon Foundation; ²Department of Geography, University of Victoria; ³Institute of Ocean Sciences, Fisheries and Oceans Canada; ⁴Pacific Biological Station, Fisheries and Oceans Canada; ⁵Ocean Network Canada



Citizen Science 2015 - 2017



- Physical and chemical parameters
- Nutrients
- Phytoplankton
- Zooplankton

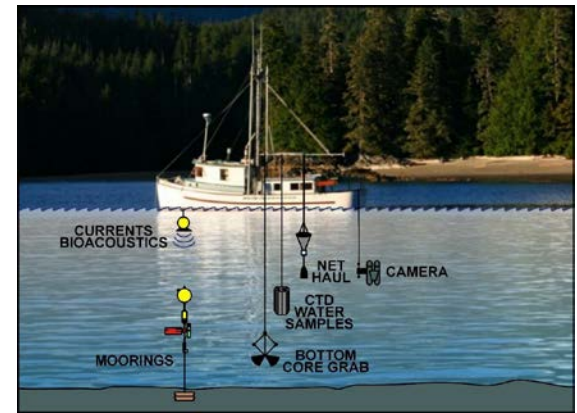
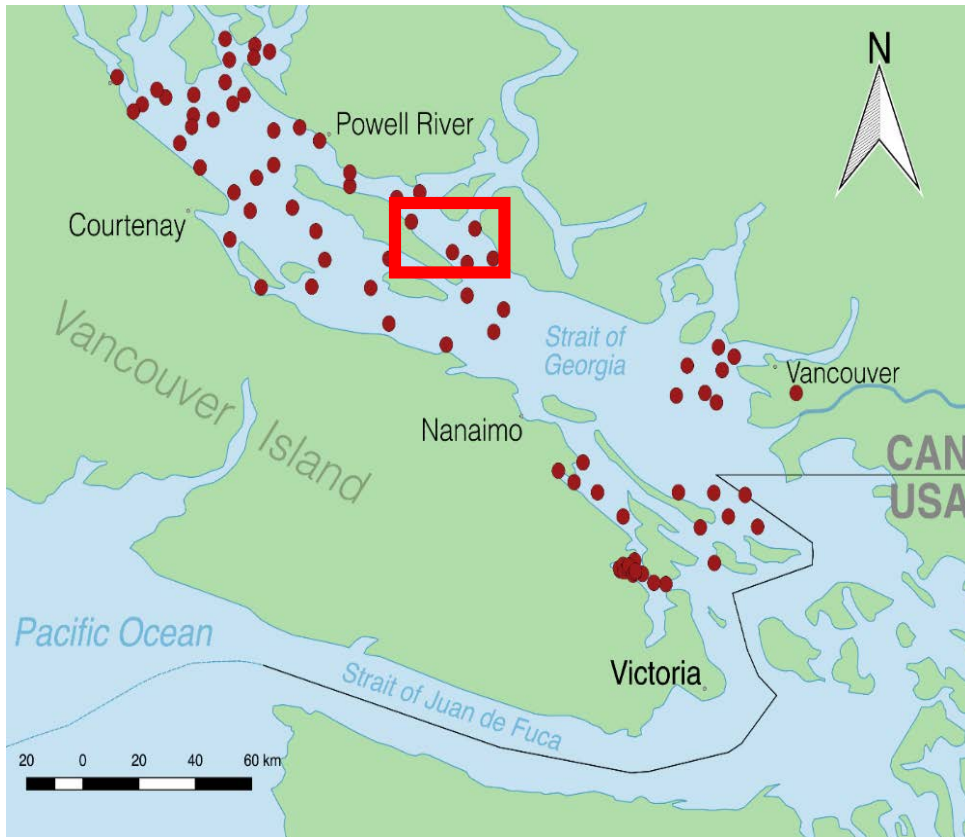
~80 locations

February – October

~ 2/3 times a month

Data: <http://www.oceannetworks.ca> <http://sogdatacentre.ca/>
pearsalli@shaw.ca – Dr. Isobel Pearsall

Citizen Science 2015 - 2017



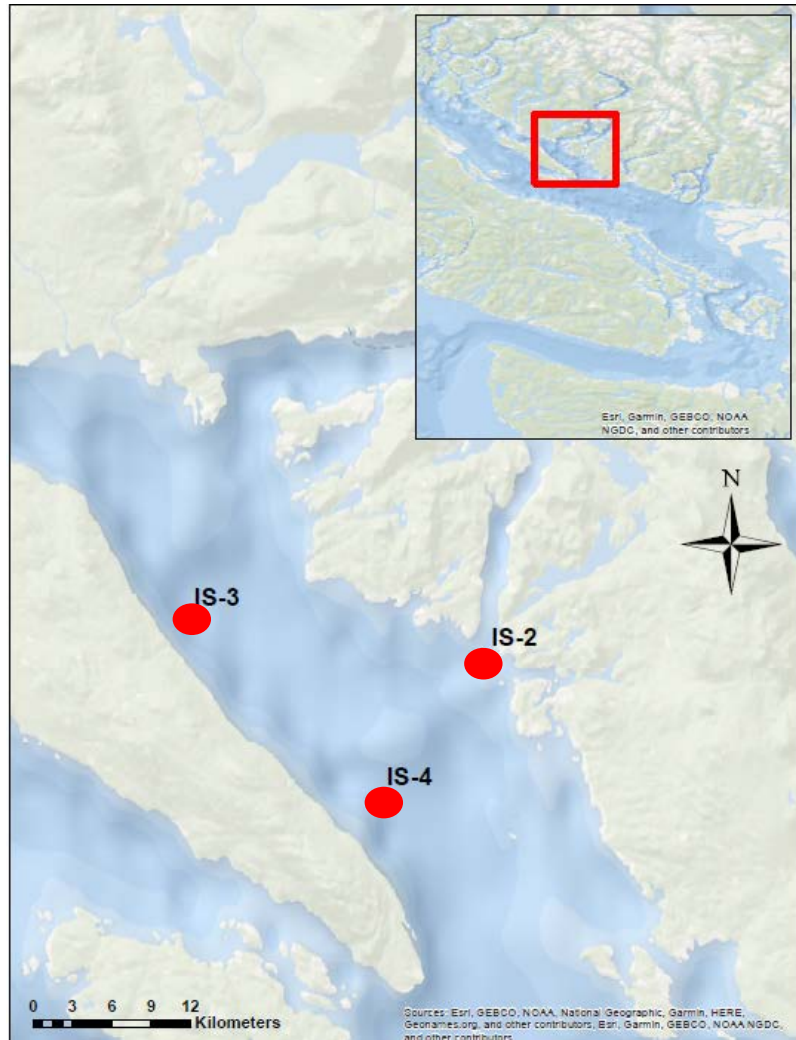
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Malaspina Strait data



Sites: IS-2 (~500m from the shore, depths <30m), IS-3 and IS-4 (>1500 m, >300 m)

Citizen Science:

CTD: temperature, salinity, Chl

Nutrients: NO_3^- , PO_4^- (0 and 20m)

In situ Phytoplankton (0 m)

In situ Zooplankton (tow sample)

Additional data:

Fraser River discharge (at Hope)

Air temperature, precipitation (Powell River)

Hours of sunshine, wind (Vancouver)

Upwelling index

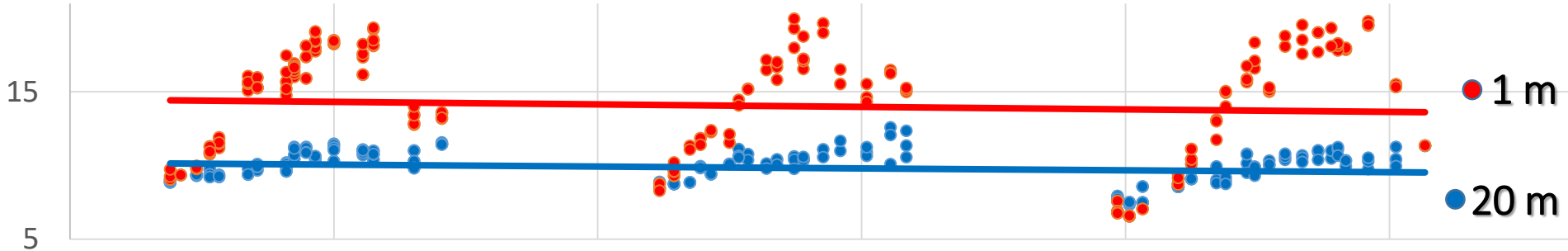
Trends

2015

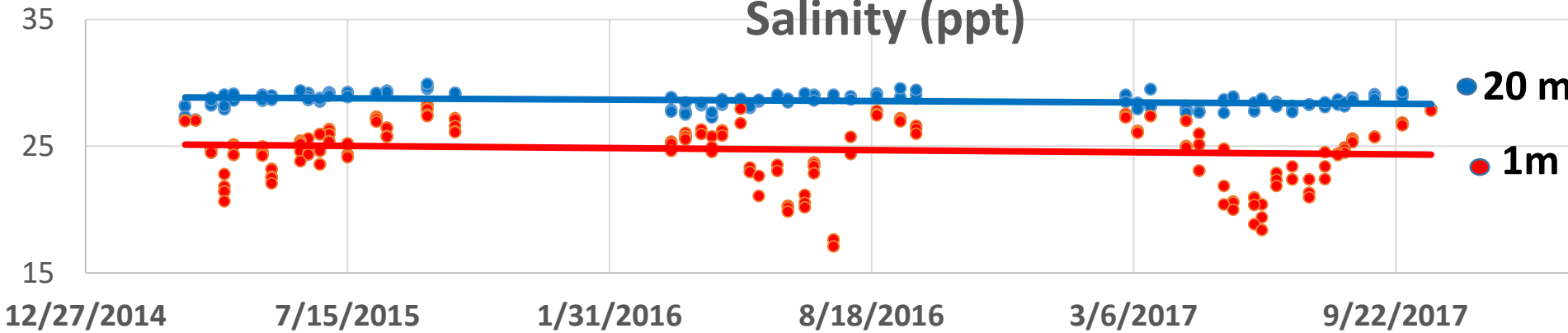
2016

2017

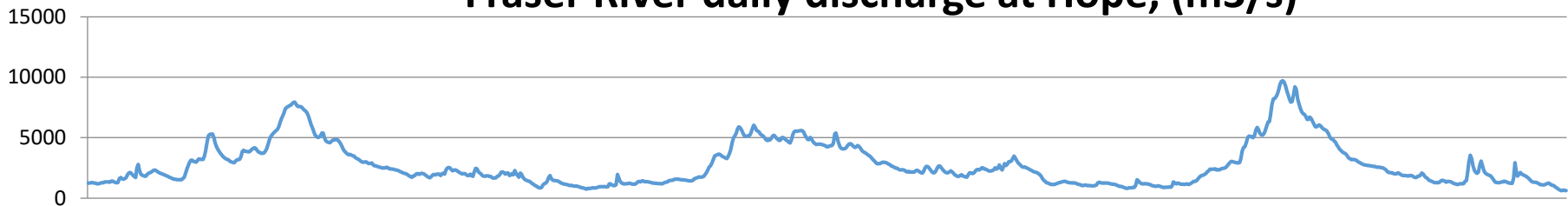
Water Temperature (C)



Salinity (ppt)



Fraser River daily discharge at Hope, (m³/s)



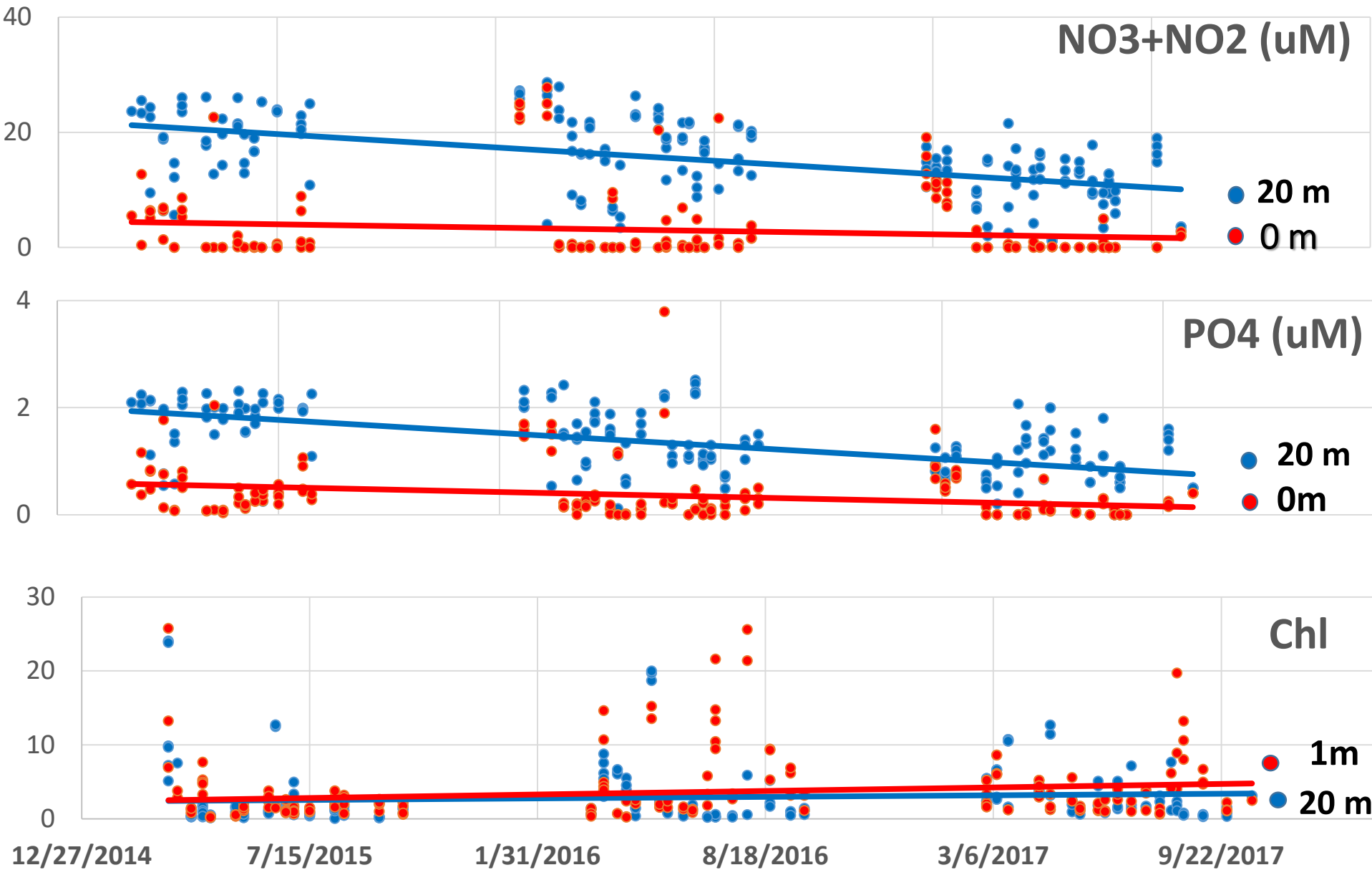
Trends

Nutrients data by Dr. Rich Pawlowicz, UBC

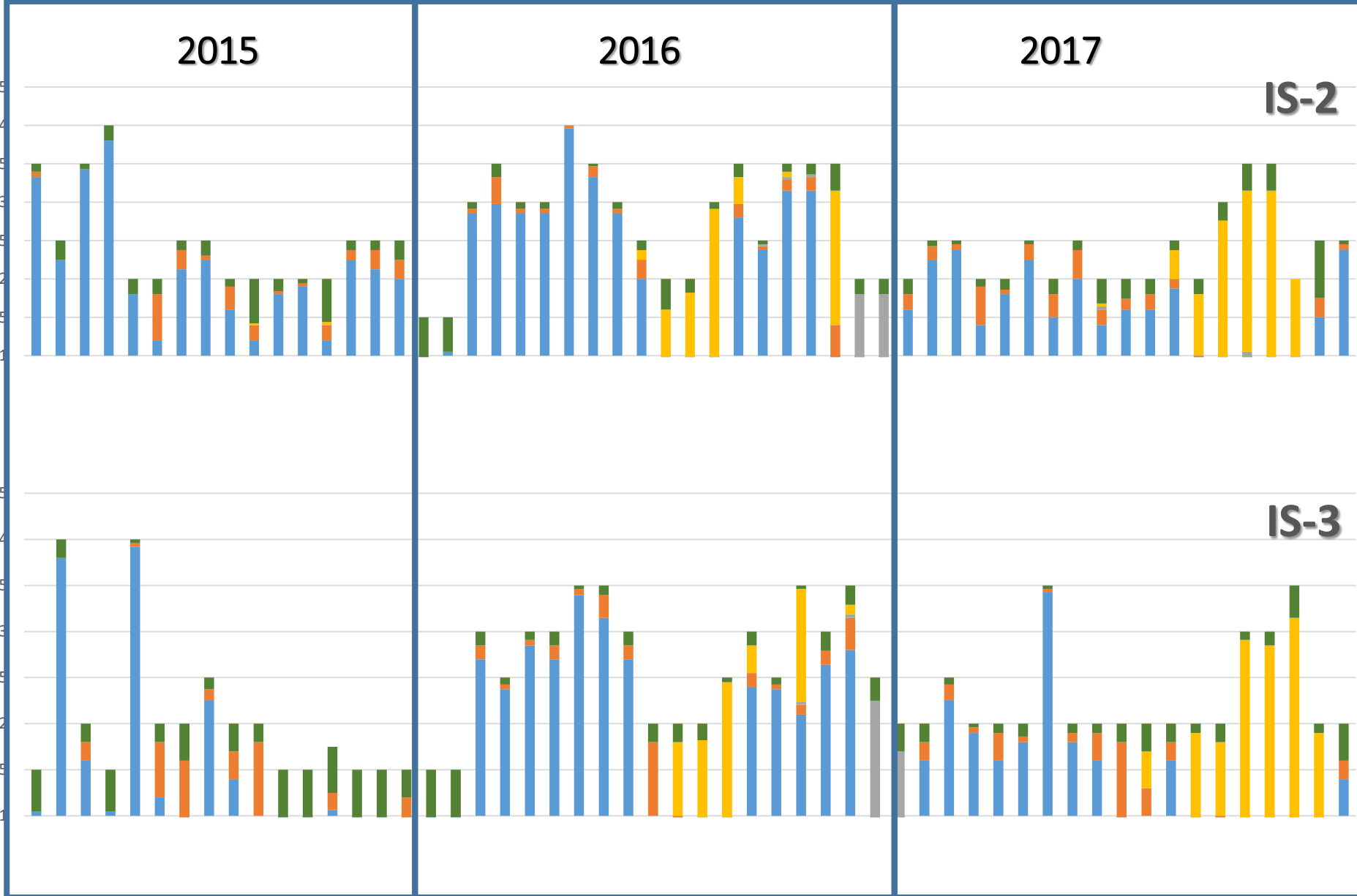
2015

2016

2017

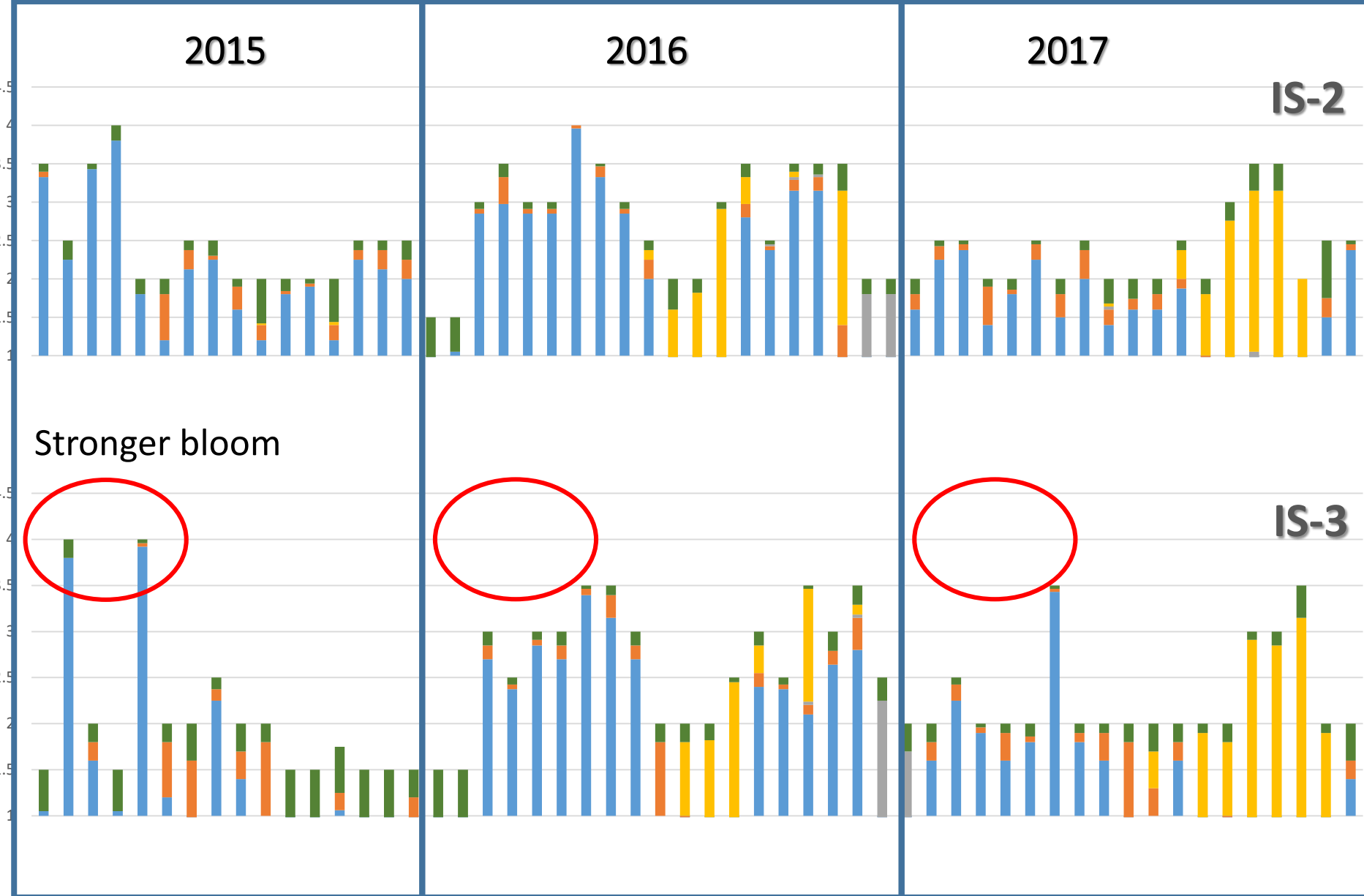


In situ phytoplankton biomass index at 0m



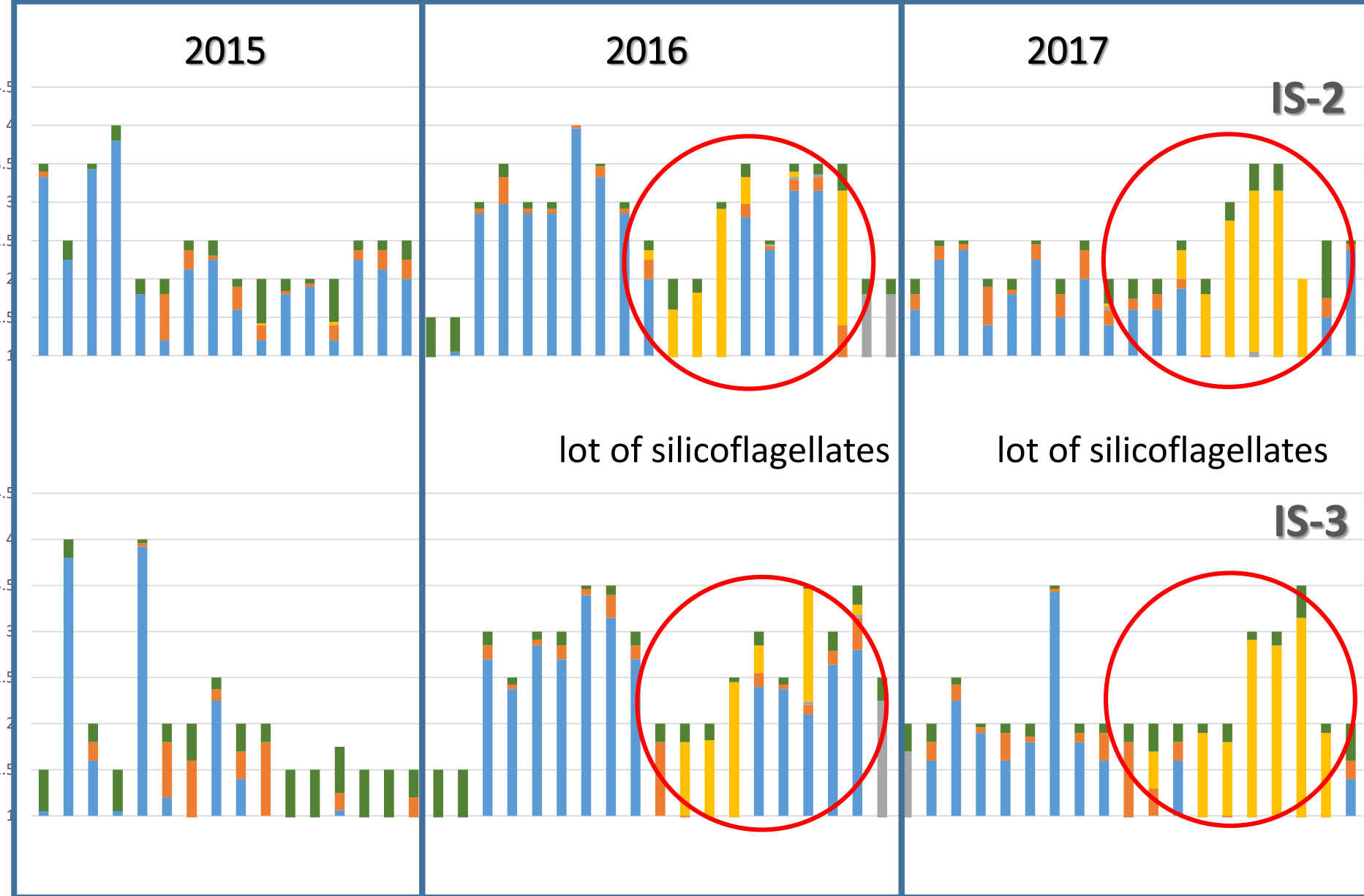
■ Diatoms
 ■ Dinoflagellates
 ■ Raphidophytes
 ■ Silicoflagellates
 ■ Other

In situ phytoplankton biomass index at 0m



■ Diatoms
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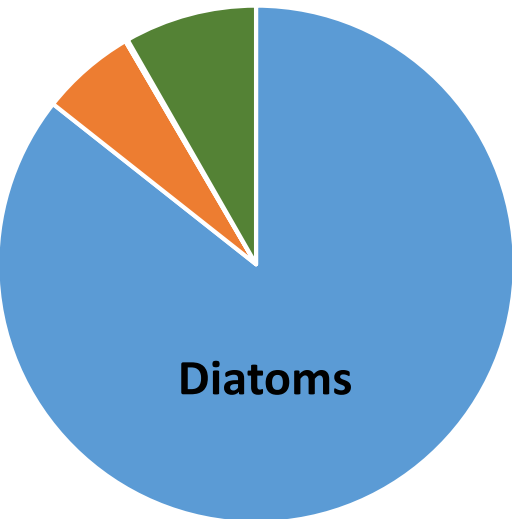
In situ phytoplankton biomass index at 0m



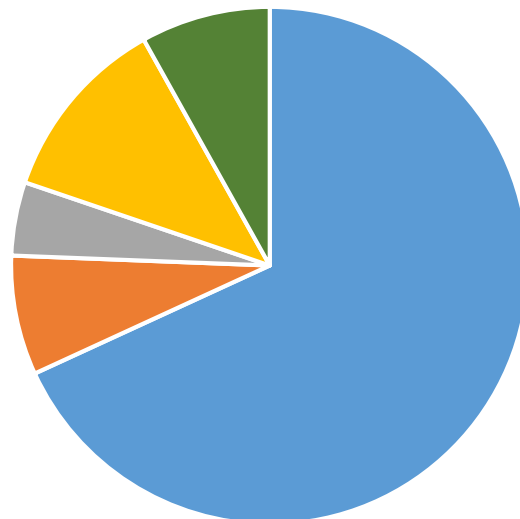
■ Diatoms ■ Dinoflagellates ■ Raphidophytes ■ Silicoflagellates ■ Other

Total phytoplankton biomass index per year

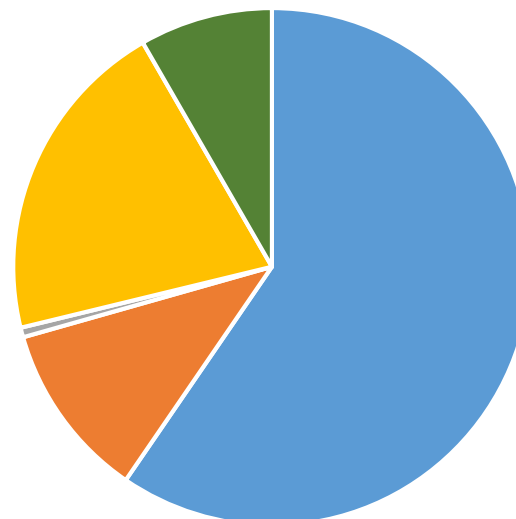
2015



2016

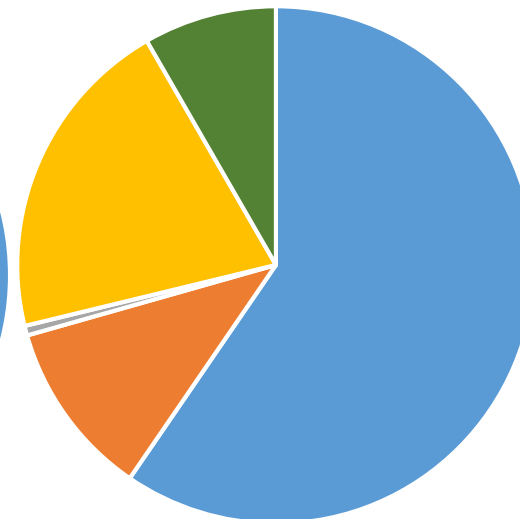
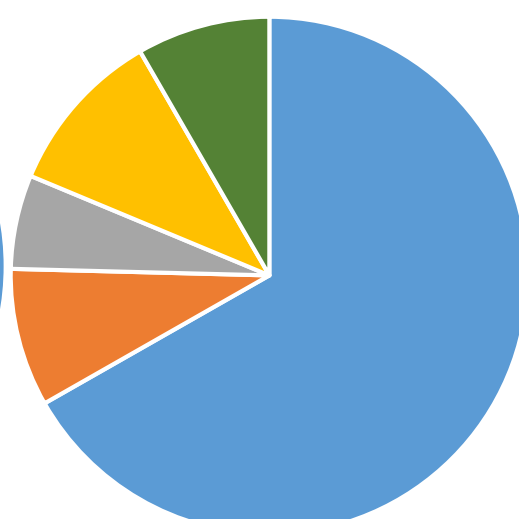
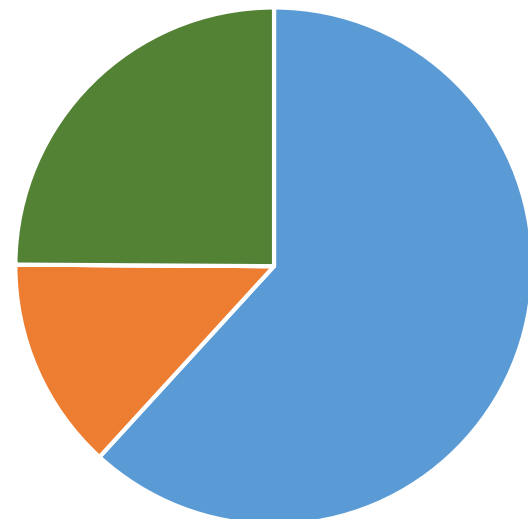


2017



IS-2

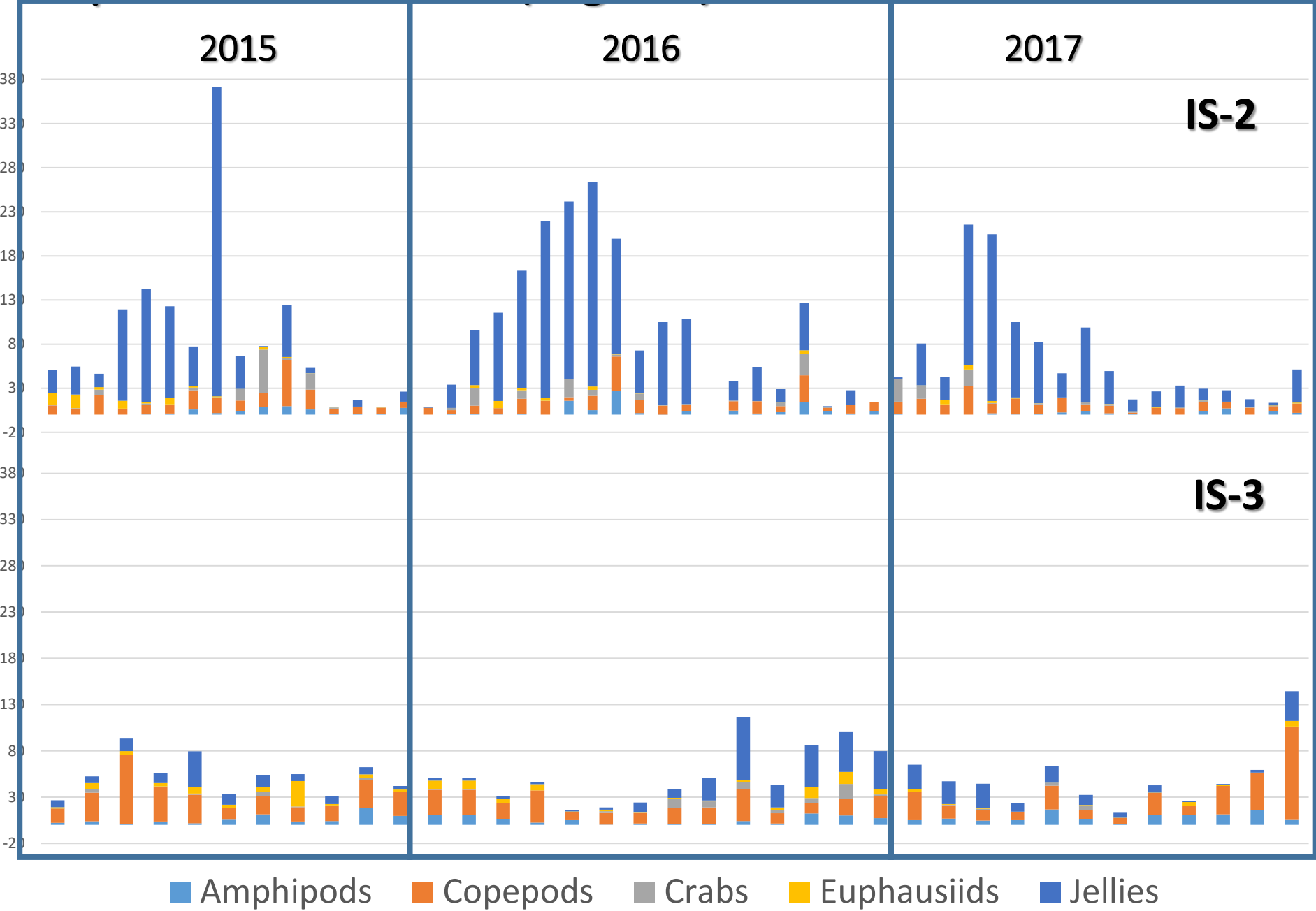
- Diatoms
- Dinoflagellates
- Raphidophytes
- Silicoflagellates
- Other



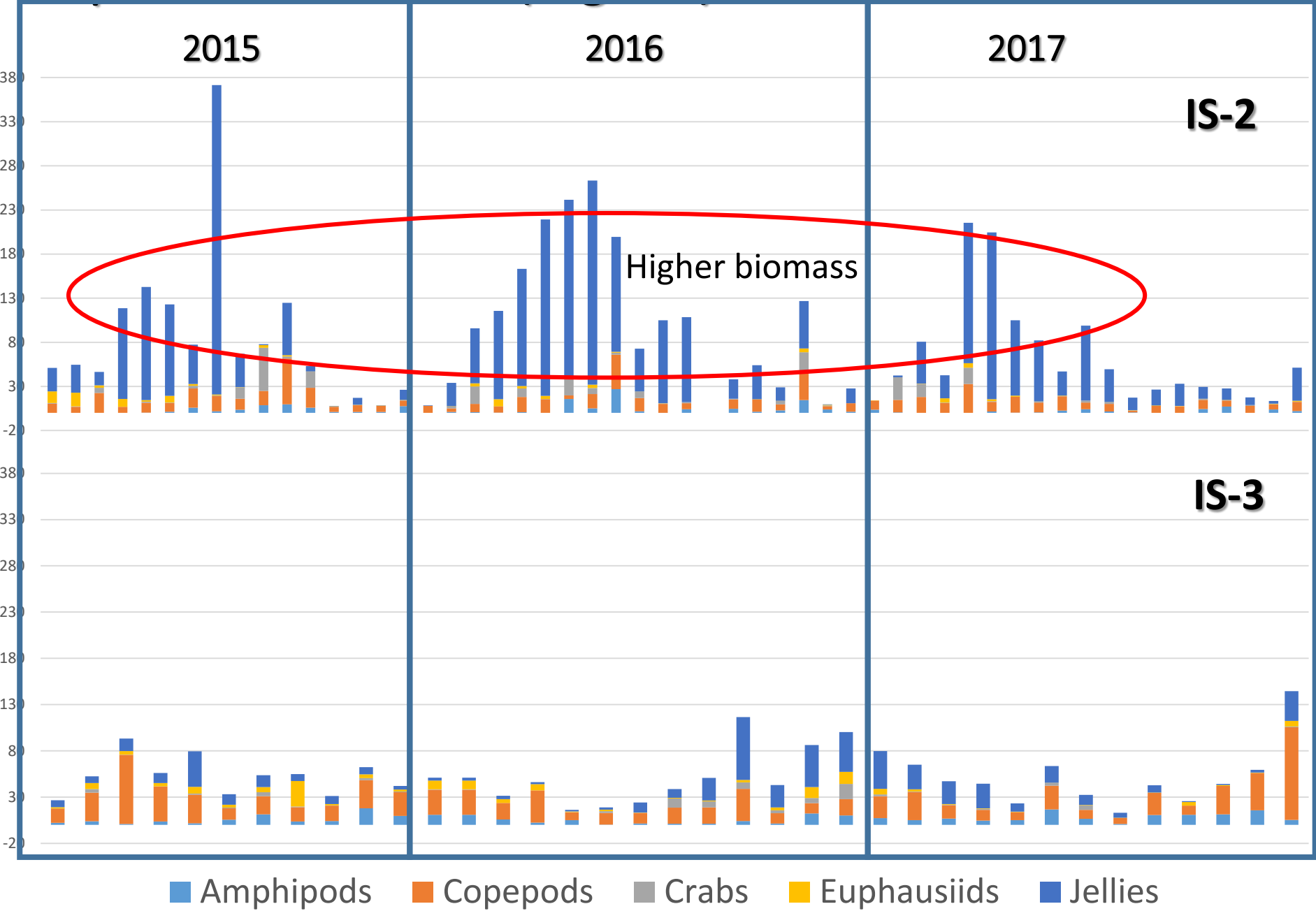
IS-3

- Diatoms
- Dinoflagellates
- Raphidophytes
- Silicoflagellates
- Other

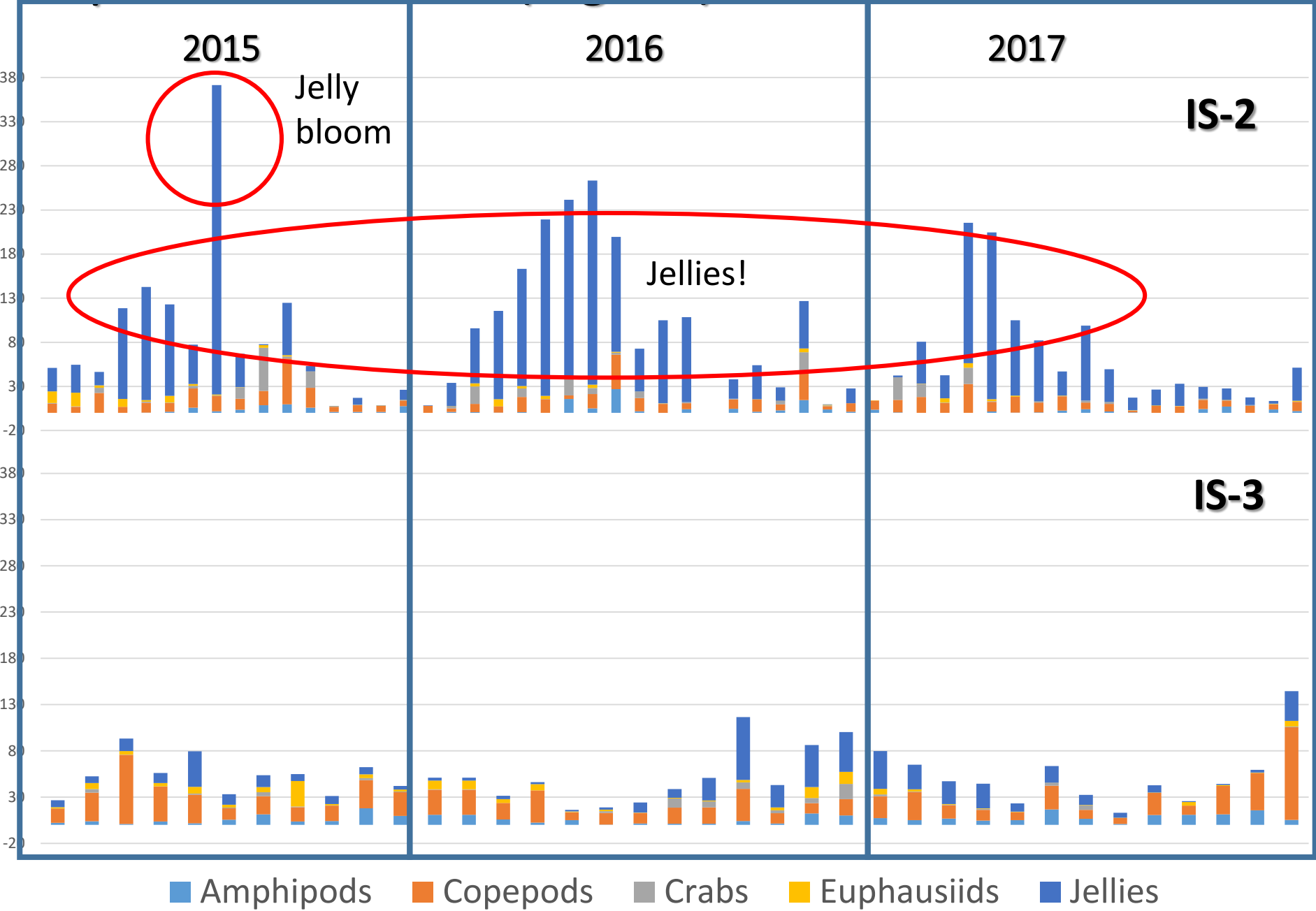
Zooplankton biomass (mg m⁻³)



Zooplankton biomass (mg m⁻³)

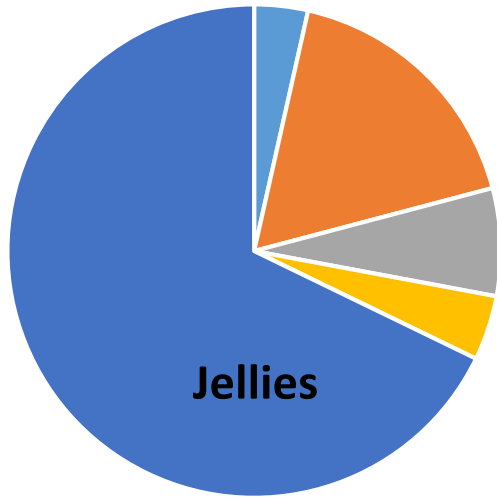


Zooplankton biomass (mg m⁻³)

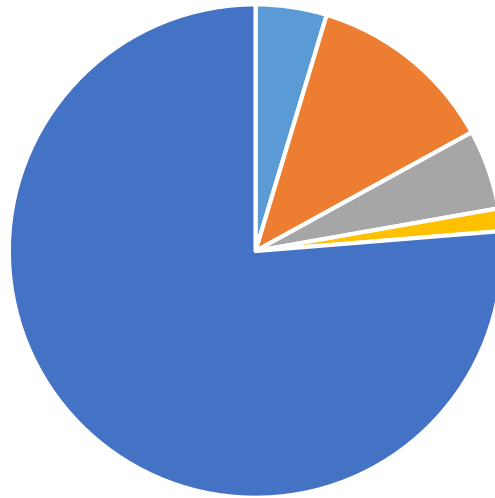


Total zooplankton biomass per year

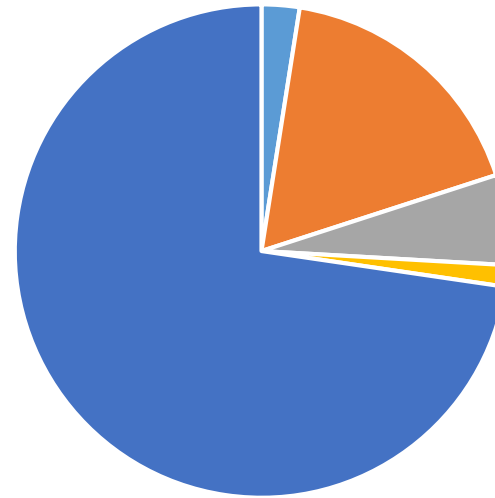
2015



2016

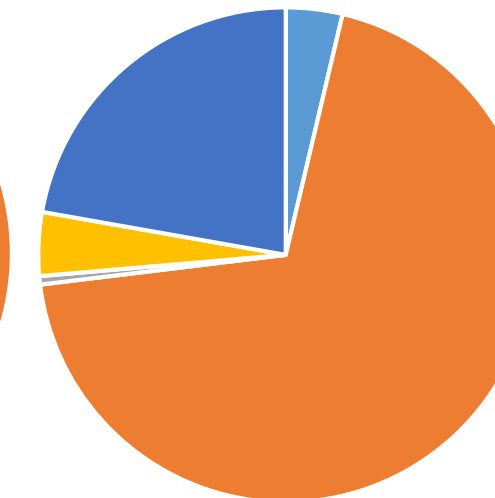
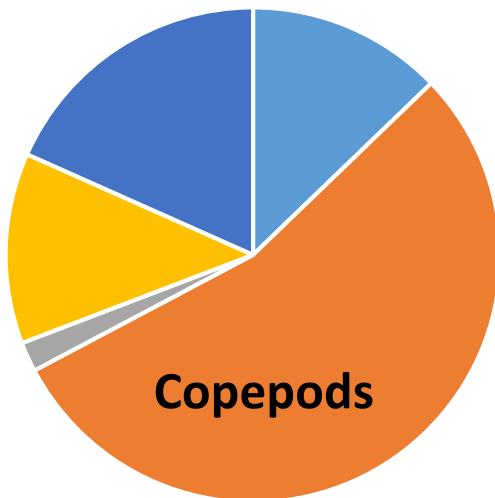


2017



IS-2

- Amphipods
- Copepods
- Crabs
- Euphausiids
- Jellies



IS-3

- Amphipods
- Copepods
- Crabs
- Euphausiids
- Jellies

Exploratory statistics, Spearman Rank Order Correlation

	IS-2		IS-3	
	% Diatoms	% Dinoflagellates	% Diatoms	% Dinoflagellates
Temp at 1 m	-0.514	0.397	-0.626	0.275
Temp at 20 m	-0.266	0.183	-0.486	0.278
Salinity at 1 m	0.199	-0.199	-0.062	0.332
Salinity at 20 m	0.211	0.213	-0.443	0.049
Chl a at 1 m	-0.003	-0.100	-0.03	-0.093
Chl a at 20 m	0.341	-0.091	0.384	-0.112
Large calanoids	0.412	-0.130	0.394	-0.241
Medium calanoids	0.475	-0.324	-0.116	0.116
Small calanoids	-0.049	0.236	-0.150	0.378
Non-calanoid copepods	-0.102	0.294	-0.372	0.376
Juvenile euphausiids	0.472	-0.277	0.546	-0.102

Summary

- This work integrates numerous data sets produced by the SSMSP
- We have 3 year series of data for oceanographic parameters, phytoplankton and zooplankton for 3 sites in Malaspina Inlet (can include Baynes Sound in future)
- Our data shows very noticeable annual variability
- Preliminary statistical analysis has promising results
- In depth work will be lead by Dr. Karyn Suchy (UVic, IOS)

Thank you
Questions?