FAO Reference Centre for Bivalve Sanitation workshop on the development of bivalve production in Africa

8th – 10th July 2025, Nairobi, Kenya

Exercise: Hazard and risk identification, and potential control methods

Food and Agriculture Organization of the United Nations

Centre for Environment, Fisheries & Aquaculture Science

Exercise – Part 1 – Hazard identification and risk assessment

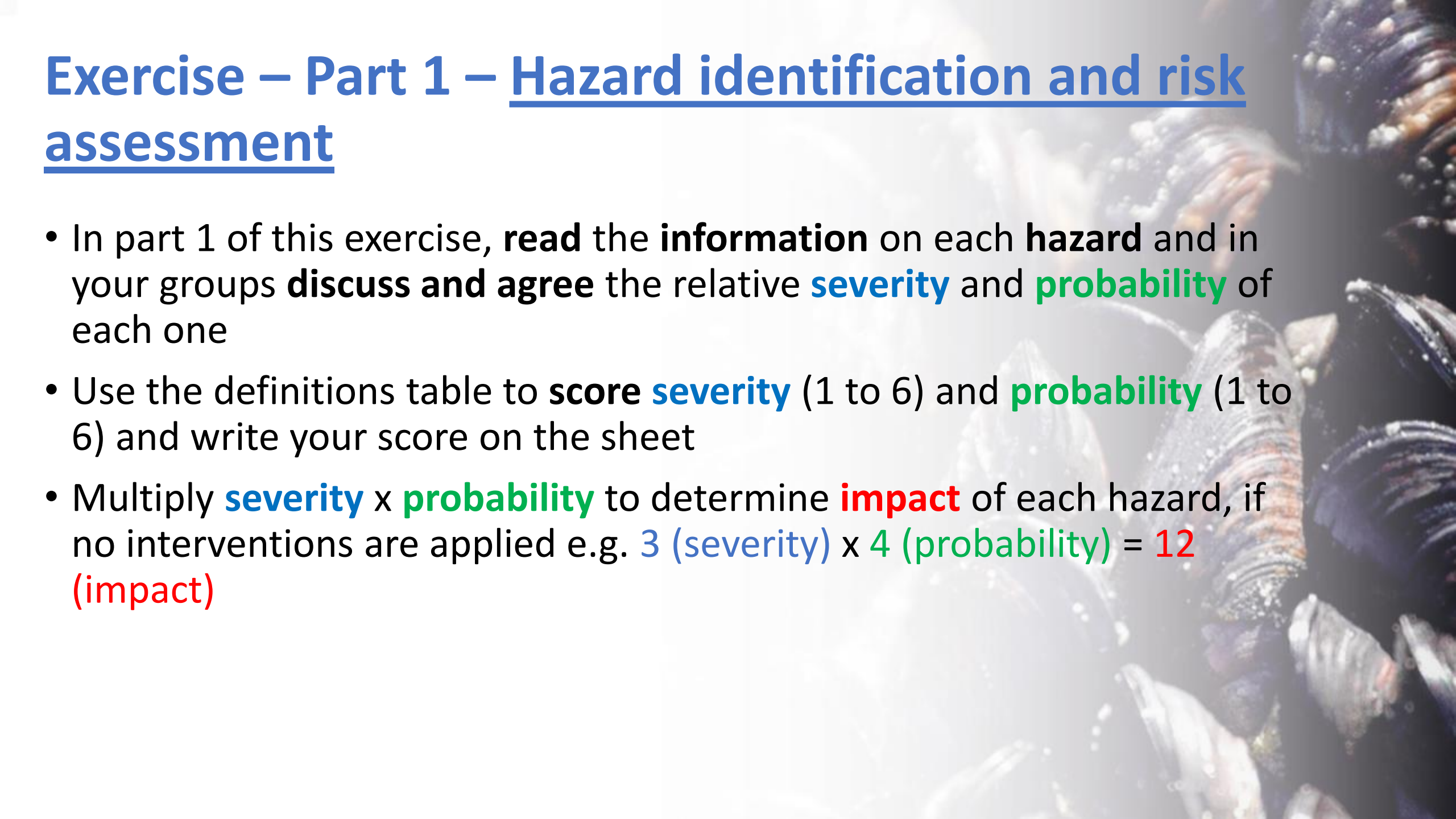
- In the previous presentation you have seen some of the **potential hazards** that **consumption** of **bivalve molluscs** can pose to the **consumer**
- International **Sanitary and Phytosanitary Standards**, and **codes of practice** e.g. **Codex Alimentarius** are in place to **control** these risks for bivalves traded live or raw
- **Legislation** is in place in **major bivalve producing countries** describing **controls** to **protect** the **consumer** from these risks
- Potential controls can be applied in **primary production** and/or to **harvested product** and include **monitoring**, **harvesting restrictions**, and **post-harvest processing**
- **Identifying hazards** and **assessing risks** in a **growing area** can help **target controls** to produce a safer product

Exercise – Part 1 – Hazard identification and risk assessment

- In this exercise we use a simple **quantitative risk assessment tool** to measure the relative potential **impact** of hazards in a growing area
- In each group (3-6 national experts with a **Cefas facilitator**) you have 10 hazard cards, each card describes a hazard that could potentially be a risk to consumers of shellfish – each card has information on:
  - The source of the hazard
  - The impact of the hazard
  - What is known about occurrence of the hazard in Africa
- **You also have a large master sheet which lists the hazards, and a marker pen!**

Exercise – Part 1 – Hazard identification and risk assessment

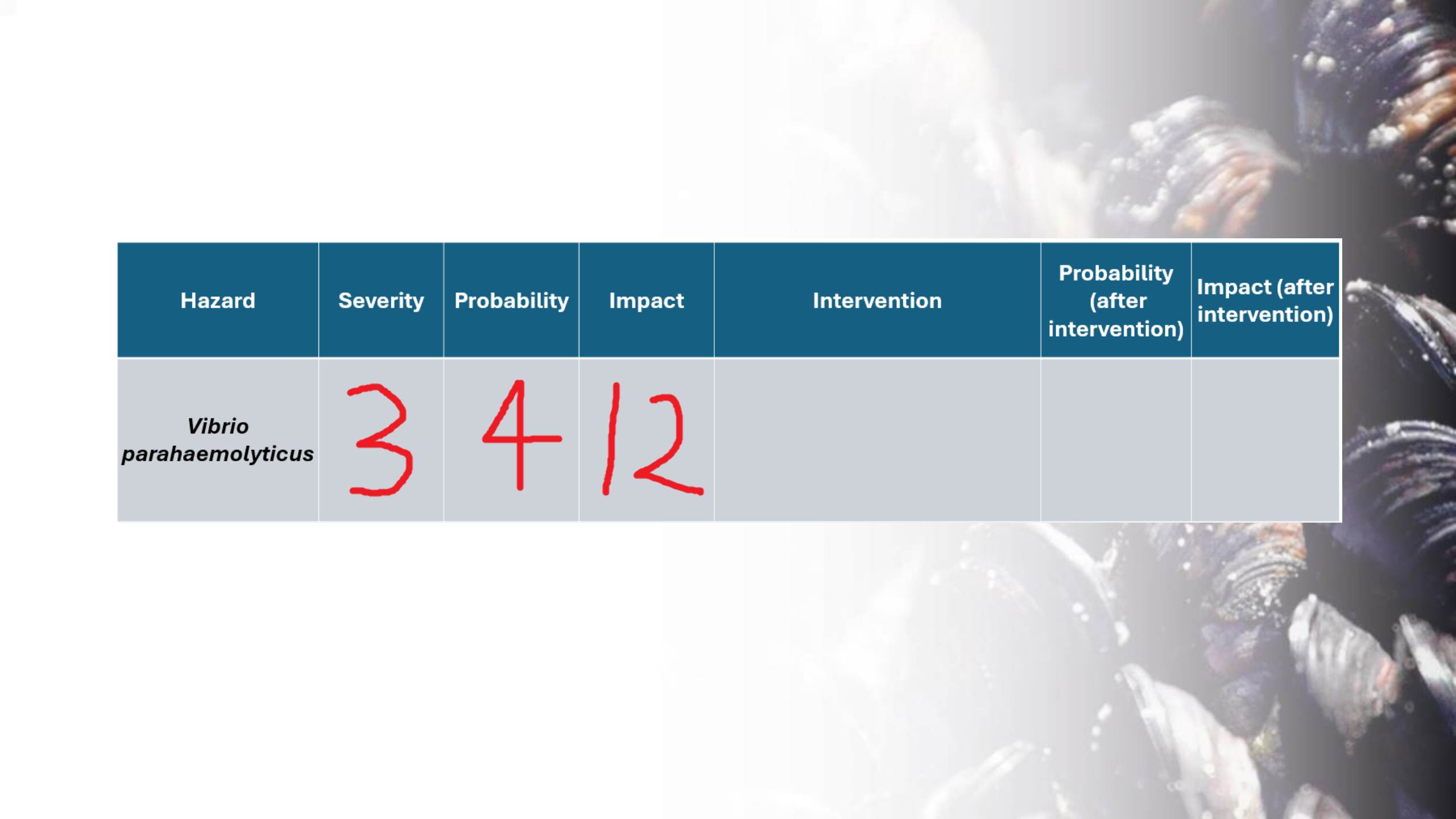
- In part 1 of this exercise, **read** the **information** on each **hazard** and in your groups **discuss and agree** the relative **severity** and **probability** of each one
- Use the definitions table to **score** **severity** (1 to 6) and **probability** (1 to 6) and write your score on the sheet
- Multiply **severity** x **probability** to determine **impact** of each hazard, if no interventions are applied e.g. 3 (severity) x 4 (probability) = 12 (impact)



Hazard	Severity	Probability	Impact	Intervention	Probability (after intervention)	Impact (after intervention)
Vibrio parahaemolyticus						

Hazard	Severity	Probability	Impact	Intervention	Probability (after intervention)	Impact (after intervention)
Vibrio parahaemolyticus	3					

Hazard	Severity	Probability	Impact	Intervention	Probability (after intervention)	Impact (after intervention)
Vibrio parahaemolyticus	3	4				



Hazard	Severity	Probability	Impact	Intervention	Probability (after intervention)	Impact (after intervention)
Vibrio parahaemolyticus	3	4	12			

SEVERITY if hazard is present in final product in terms of consumer health or trade	Score	PROBABILITY of occurrence of hazard in final product if no controls or interventions are applied	Score
Negligible – no known or expected impacts on consumer health or trade	1	Negligible – no expectation of occurrence of hazard	1
Very low – any impact considered to be minimal and transitory	2	Very low – hazard may occur in rare cases	2
Low – impact on consumer health or trade minimal, or notable but transitory	3	Low – occasional spatial and/or temporal occurrence of hazard	3
Medium – impact on consumer health or trade notable and sustained	4	Medium – significant spatial and/or temporal occurrence of hazard	4
High - impact on consumer health or trade significant and persistent	5	High – widespread spatial and/or temporal occurrence of hazard	5
Very high – serious public health consequences that may prevent trade	6	Very high – occurrence of hazard is ubiquitous	6

Exercise – Part 1 – Hazard identification and risk assessment

- Group 1; Edia, Antonio, Jovita
- Group 2; Franck, Jasper, Massaer, Abdi-Rachid, Husseen, Mariama
- Group 3; Bakanding, John, James W., Daniel, Eunice, Sattiss

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Exercise – Part 2 –Interventions

- We have provided you with sets of green cards for each of 6 different interventions that can reduce the impact of hazards

MONITORING & HARVESTING RESTRICTIONS

Testing for hazards or indicators informs the level of post harvest treatment, including temporary harvesting restrictions

RELAYING

Moving bivalves to defined natural areas of very clean seawater and holding them for an extended period before harvest allows them to purge contaminants naturally

DEPURATION

Placing bivalves in tanks of clean seawater (with UV treatment) after harvest allows them to purge contaminants naturally

COLD CHAIN

Keeping harvested product at refrigerated temperatures helps to prevent the growth of bacteria that may cause human illness

COOKING

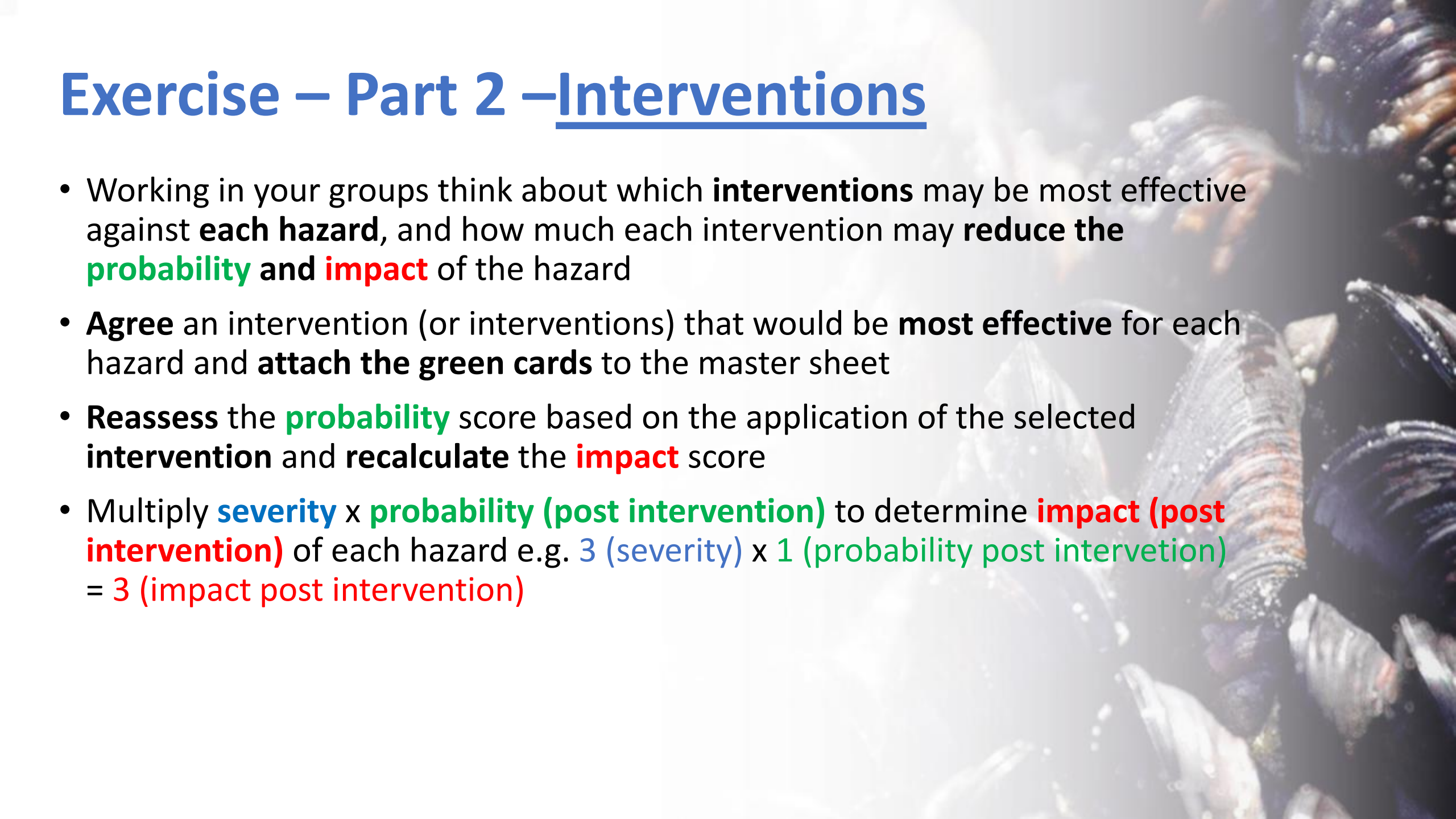
Raising the internal temperature of the product to at least 90°C for 90 seconds inactivates microbiological pathogens

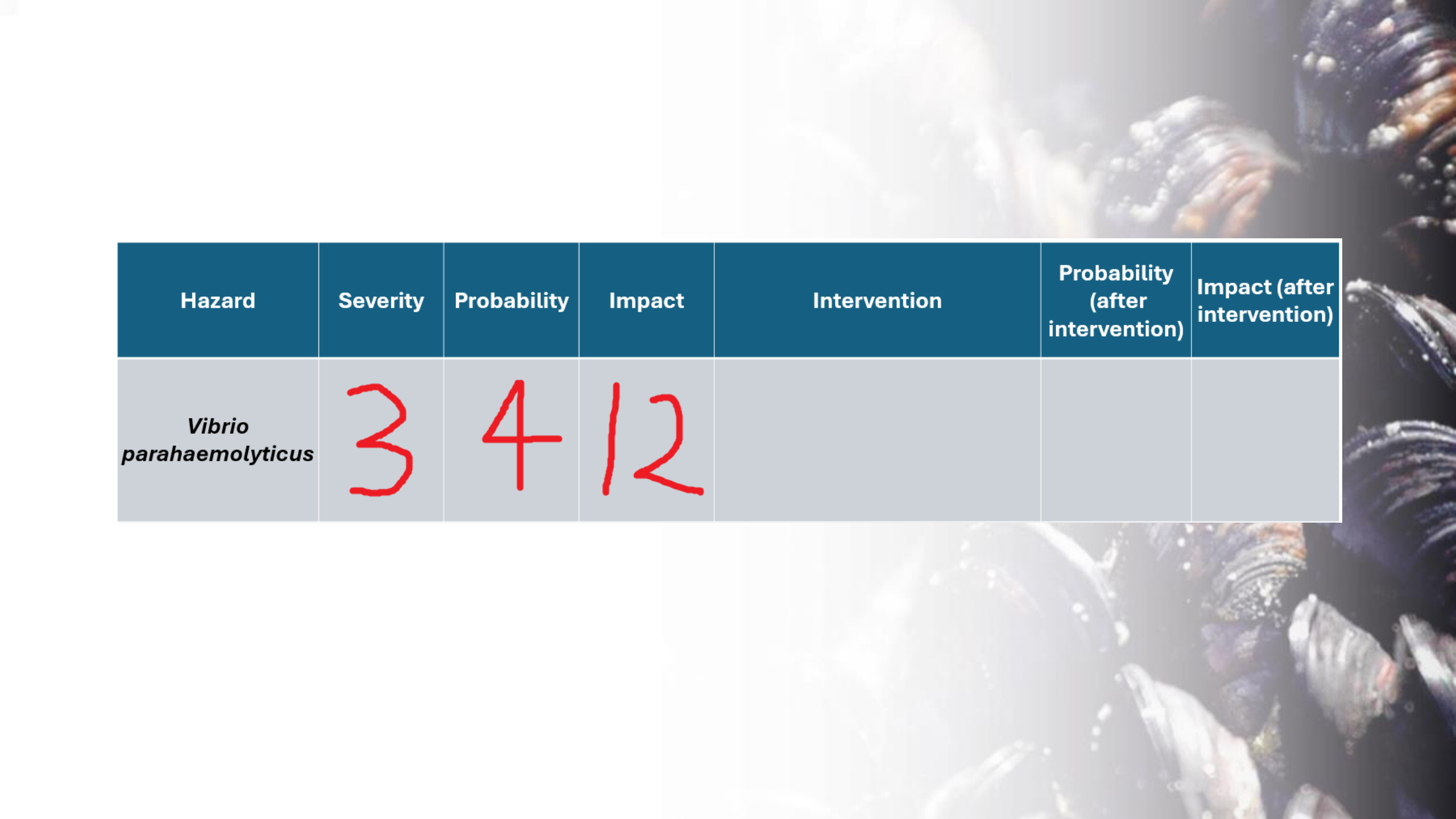
HIGH PRESSURE PROCESSING

Innovative techniques such as applying high pressure (400-600 MPa) to harvested product can inactivate microbiological pathogens

Exercise – Part 2 –Interventions

- Working in your groups think about which **interventions** may be most effective against **each hazard**, and how much each intervention may **reduce the probability and impact** of the hazard
- **Agree** an intervention (or interventions) that would be **most effective** for each hazard and **attach the green cards** to the master sheet
- **Reassess** the **probability** score based on the application of the selected **intervention** and **recalculate** the **impact** score
- Multiply **severity** x **probability (post intervention)** to determine **impact (post intervention)** of each hazard e.g. 3 (severity) x 1 (probability post intervetion) = 3 (impact post intervention)





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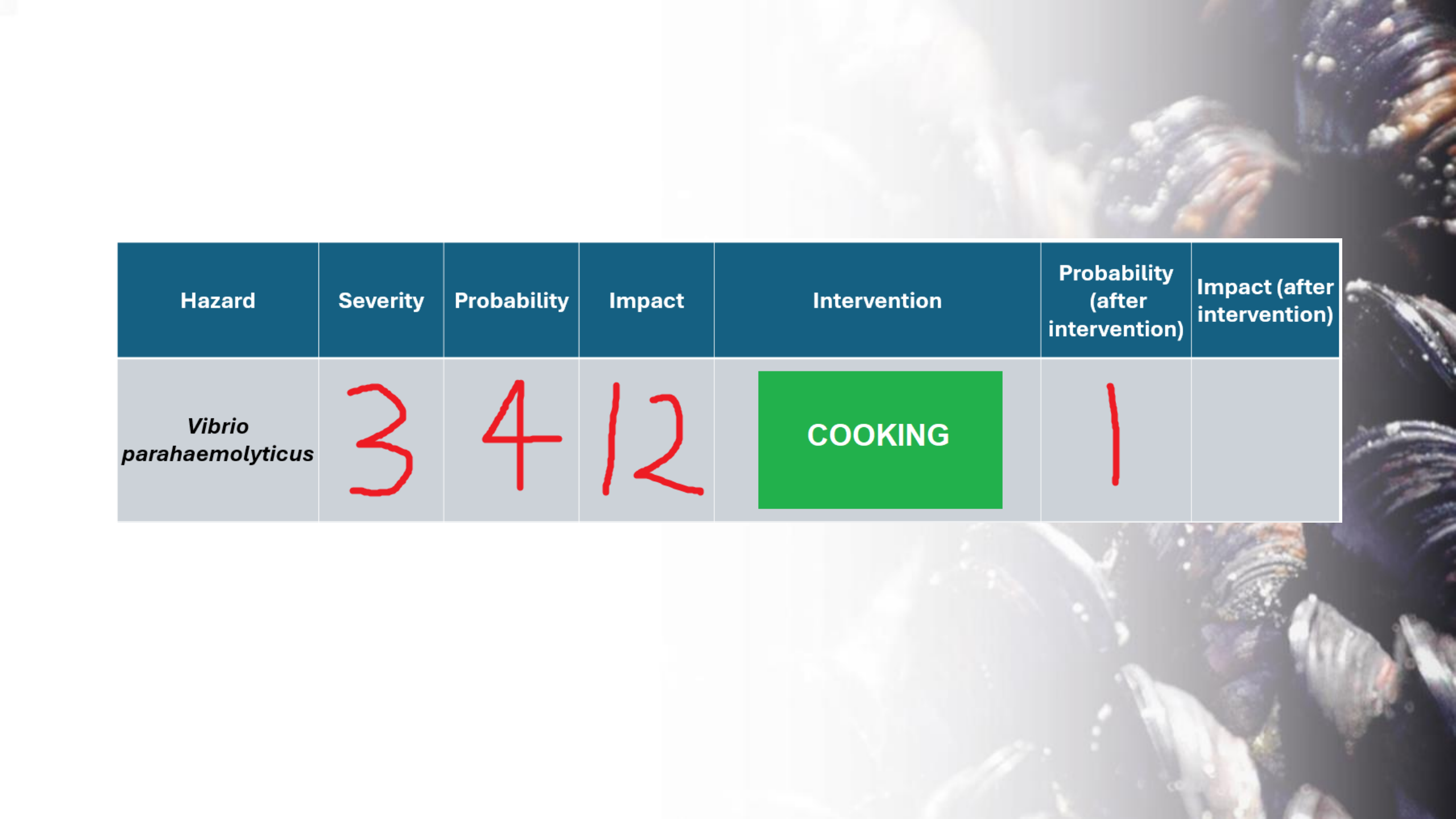

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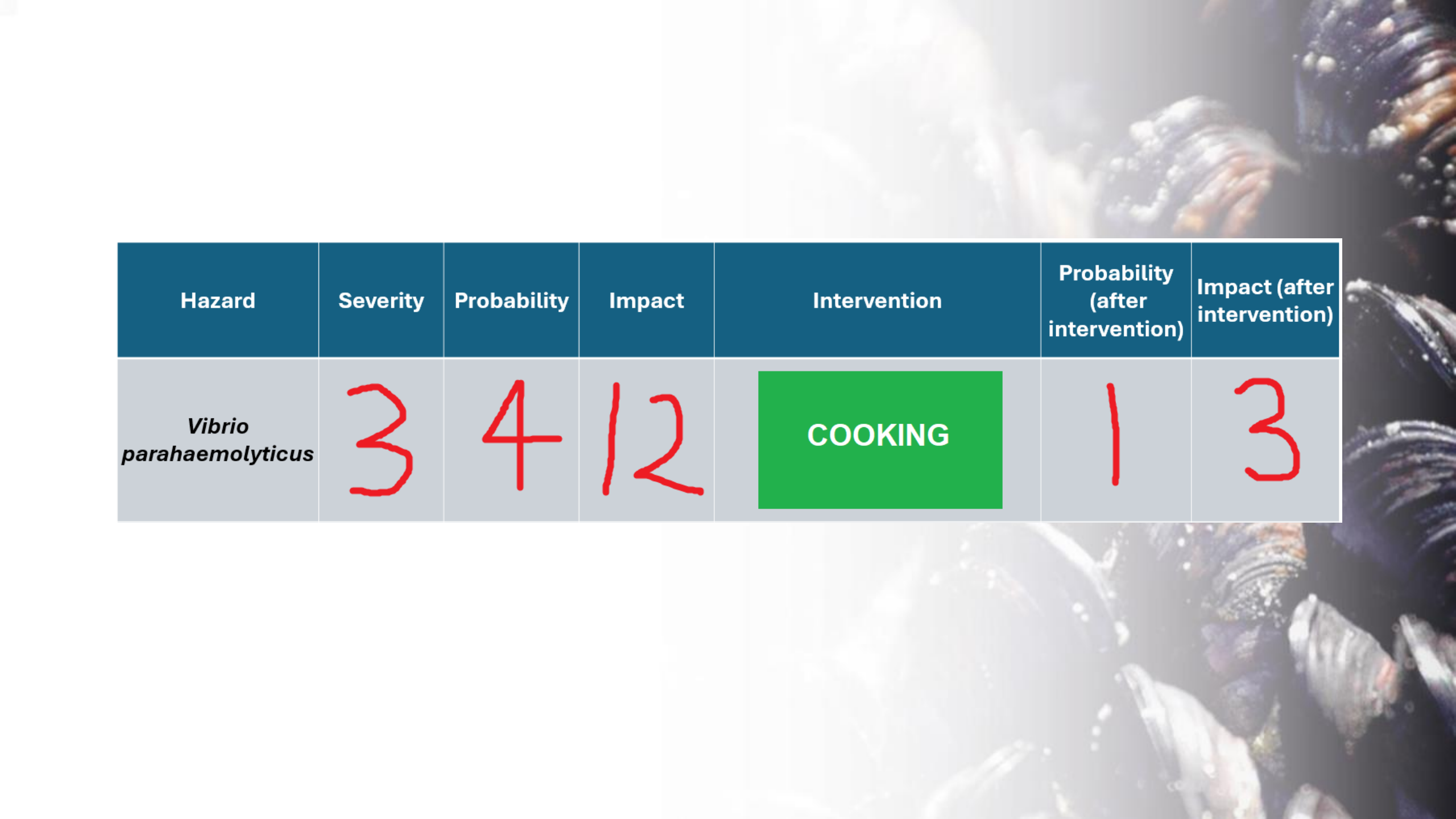
Vibrio parahaemolyticus	3	4	12	COOKING	1	



Hazard	Severity	Probability	Impact	Intervention	Probability (after intervention)	Impact (after intervention)
Vibrio parahaemolyticus	3	4	12	COOKING	1	3

Exercise – Part 2 –Interventions

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Exercise – Conclusion

- Different shellfish hazards have very different health impacts, ranging from mild illness e.g. gastroenteritis caused by norovirus, to very serious illness and death in some cases caused by e.g. algal neurotoxins or *Vibrio vulnificus*
- Some shellfish hazards can be uncommon, while others can occur very widely and frequently e.g. norovirus in Europe
- In all cases the occurrence of each hazard will be very different depending on the characteristics of the growing area e.g. temperature, salinity, impact of human sewage, proximity of industry or agriculture
- There are a variety of different interventions available to reduce risk however these are very different in how effective they are against different hazards e.g.
  - Cooking has very low impact on biotoxin risk (toxins are temperature resistant)
  - Maintenance of the cold chain has no impact on norovirus risk (norovirus does not grow outside the human body)
- Well-managed monitoring and harvesting restrictions are effective against most hazards

Any questions?

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