Executive Summary: Effects of the April 2020 Oil Spill Detected in Study of Mussel Genes

Rogue transcription task force:

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Spill Details

-April 12, 2020

-Valdez Marine Terminal (VMT) in Port Valdez, Alaska

-1,400 gallons (~34 barrels) of Alaska North Slope (ANS) crude oil

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Location	Sampling Date	Elapsed days of study	Chemistry replicates	Transcription replicates
Spill site (HOTA)	4/30/2020	1	3	3
	5/13/2020	14	3	3
	5/20/2020	21	3	3
	5/27/2020	28	2	3
	6/3/2020	35	2	3
	6/11/2020	43	3	3
	6/18/2020	50	NA	3
	6/24/2020	56	NA	3
	7/6/2020	68	NA	3
	7/22/2020	82	2	3
	8/19/2020	111	NA	3
Valdez boat harbor (HARA)	6/8/2020	40	6	6
Negative control, Jack and Galena Bays (BAY1A)	6/9/2020	41	6	6

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What is different from our last analysis?

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Project goals

1) How quickly do mussels purge oil and return to background levels?
2) Which genes respond to oil and can they be used to detect and track future spills?
3) How do gene activity and hydrocarbon chemistry compare over time, after a spill?
4) Can the gene response identify differences in exposure to ANS crude oil versus harbor contaminants?

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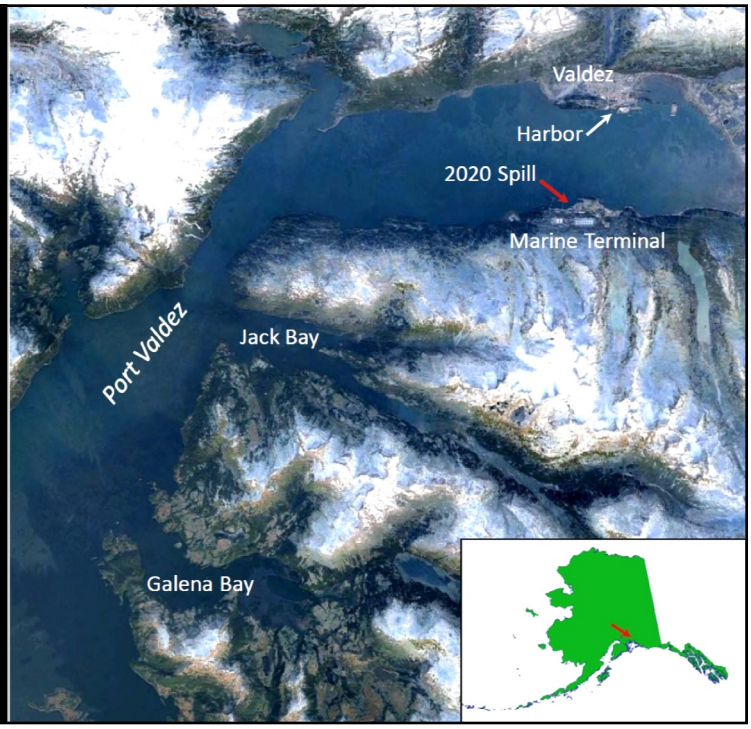
Location of spill and sample collection



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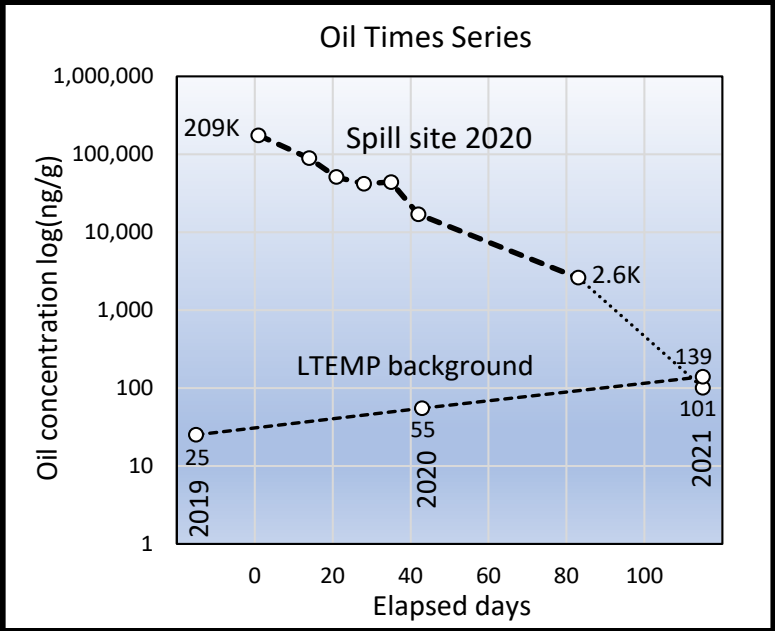
Question 1:
Chemical purge time?



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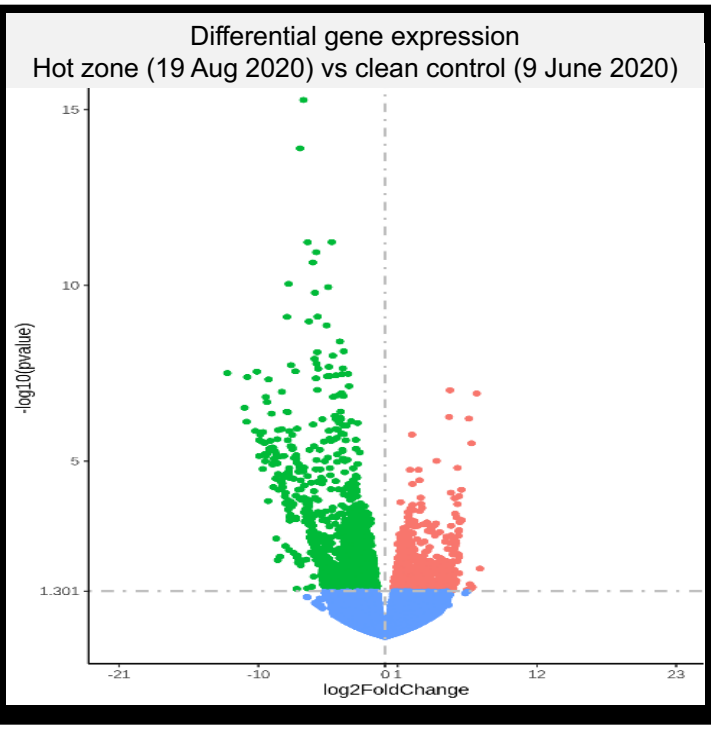
Question 2:
Return to gene expression baseline?



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Question 3:
Biological systems involved?

Detoxification

Oxidative stress

Neurotransmitters

Immune function

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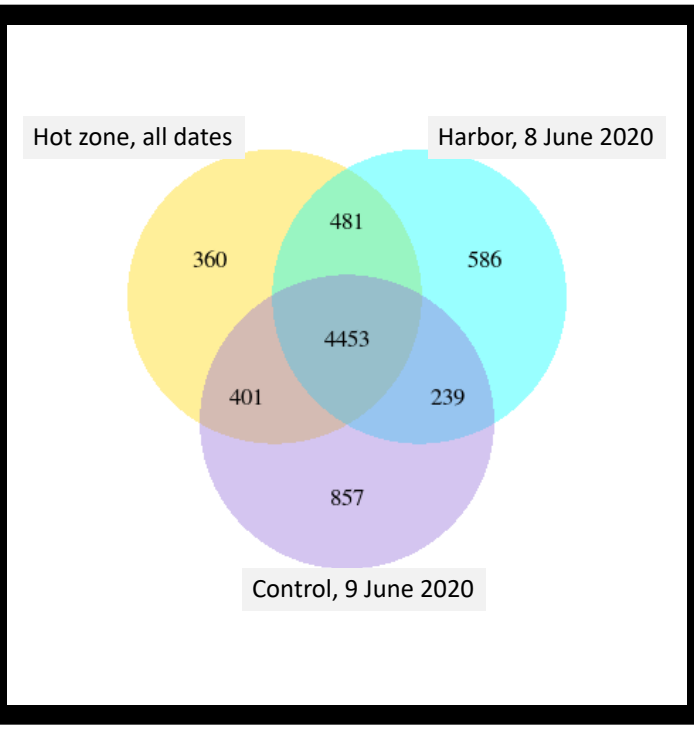
Question 4: Response to ANS crude vs control or harbor?



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Differentiation between sites

~ 25 candidate genes

Spill site
(ANS crude oil)

Reference sites
(Relatively "clean")

Harbor
(contaminants)

~ 25 candidate genes

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Recommendations

Future monitoring and spill response research

- → Validate (controlled studies)
- → Develop and refine gene panel selected for monitoring
- → Additional control samples

Continuing LTEMP studies

- → Benefits from co-monitoring both hydrocarbon body burdens & gene transcription
- → Pending method development, continue with original 14 gene panel

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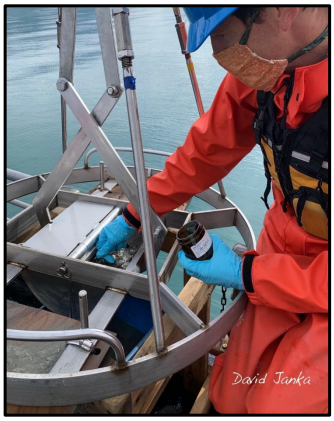
Thank you very much for your continued input and support!



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