



Stakeholder Perceptions of Environmental and Climate Change in the USVI

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Background & Objectives

- Select data from project funded by the Caribbean Fishery Management Council to better understand the impacts of climate and environmental change on USVI fisheries and fishing communities from a stakeholder viewpoint.

Seara, T., K. Jakubowski, and R. Pollnac. 2022. Assessing Impacts of Environmental and Climatic Changes on USVI Fisheries from a Stakeholder Perspective. Final Report for the Caribbean Fishery Management Council. 67p.

- Similar effort was done in Puerto Rico between 2016-2018, funded by Coral Reef Conservation Program (PI Seara): currently working on combined/comparative analyses.

Seara, T., K. Jakubowski, R. Pollnac, and T. Webler. 2018. Assessing Socioeconomic Impacts of Climate Change on Puerto Rico's Coral Reef Fisheries through a Participatory Approach. Final Report for the NOAA Coral Reef Conservation Program NA16NOS4820051. 107p.

- Purpose of this presentation is mostly to provide an example of the use of survey and interview methodology to collect socio-economic information and LEK.

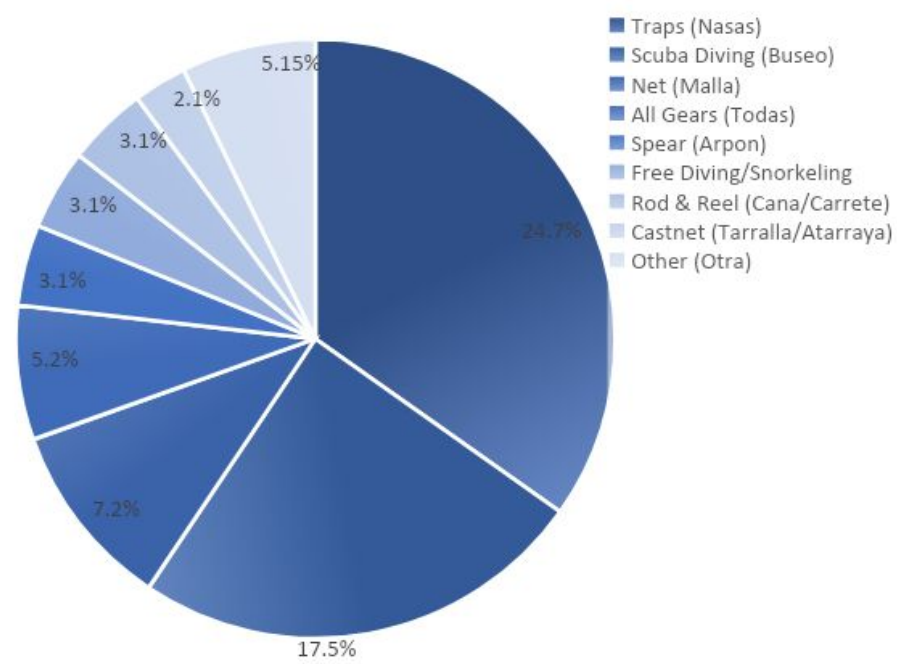
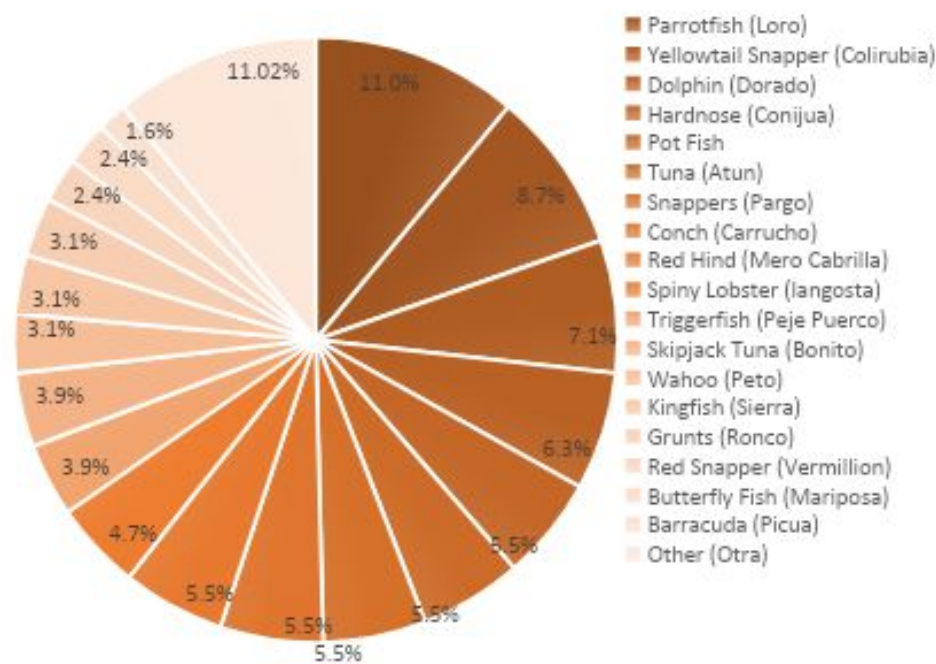
Data Collection

Methods of Data Collection:

- 20 Key Informant interviews representing 5 stakeholder groups: Fishers (n=4: 3 commercial and 1 recreational), Academics/Researchers (n=6), Managers (n=7), NGOs (n=2), and Businesses (n=1).
- Surveys with 48 commercial fishers in St Thomas (n=21) and St Croix (n=27) between July 2021 – January 2022.
 - The questionnaires included questions on demographics, work and fishery attributes, well-being and job satisfaction, perceptions of the **status of fishery resources and the environment, perceptions of climate change**, and views on aspects of governance and participation in fisheries management. The questionnaire also included questions about the impacts of hurricanes and Covid-19 pandemic on fishing activities.

Characteristics of the Survey Sample

Gear Types and Species Targeted:



Perceptions of the status of fishery resources

Table 8. Frequency of responses about current status of fishery resources.

Resource Status			STT/J		STX	
	N	%	N	%	N	%
In very bad shape	1	2.2	0	0	1	3.8
In bad shape	8	17.8	4	21.1	4	15.4
In neither good nor bad shape	13	28.9	6	31.6	7	26.9
In good shape	20	44.4	9	47.4	11	42.3
In very good shape	3	6.7	0	0	3	11.5
Total	45	100.0	19	100.0	26	100.0

3.36 (SD = 0.93), 1-5 Likert scale

Table 9. Fishers' perceptions on the shape of the fishery resources compared to 10 years ago.

	Worse		Equal		Better	
	N	%	N	%	N	%
STT/J	10	50	10	50	0	0
STX	9	37.5	12	50	3	12.5
Total	19	43.2	22	50	3	6.8

1.67 (SD. = 0.61), 1-3 Likert scale

$\chi^2 = 2.895, p > 0.05$

Perceptions of the status of fishery resources

Table 10. Reasons given by fishers for resource shape to have worsened in the past decade.

Reason	N	% Responses
Bad weather/Hurricanes	8	21.6
Overfishing	6	16.2
Less fish	5	13.5
International/Illegal fishing	3	8.1
Water temperature increased	2	5.4
Climate change/Global warming	2	5.4
More effort	2	5.4
Have to go farther away	2	5.4
Price of fish increased	1	2.7
Tides	1	2.7
No bait	1	2.7
Pollution	1	2.7
Change in species composition	1	2.7
Management/Closed areas/Catch limits	1	2.7
Cost of fishing increased	1	2.7
Total Responses	37	100.0

Perceptions of Environmental and Climate Change

- Over half of the fishers interviewed (55.3%, N = 26) believed the local climate to be changing (STT/J: 60%, N = 12 and STX: 51.9%, N = 14 ($\chi^2 = 0.309$, $p > 0.05$))
- Concern with climate change was **moderate**, averaging 5.42 (SD. = 2.99) on a Cantril self-anchoring 10-point scale (1 = not worried at all and 10 = very worried).

Table 12. Changes in climate observed by fishers

Climate Related Changes	N	% Responses	STT/J (N)	STX (N)
Weather changes	12	34.3	6	6
Change in water temperature	5	14.3	4	1
Change in currents	4	11.4	2	2
Algae growth	3	8.6	2	1
Change in seasons	3	8.6	1	2
Impacts on reefs	2	5.7	0	2
Change in tides	1	2.9	1	0
No bait fish	1	2.9	1	0
Change in species behavior	1	2.9	1	0
Change in winds	1	2.9	1	0
Change in seas	1	2.9	1	0
Sea Level Rise	1	2.9	0	1
Total Responses	35	100.0	20	15

Perceptions of Environmental and Climate Change

- More than half of all fishers surveyed (58.7%, N = 27) said that they did not observe any changes in the marine environment, fish, and shellfish that they believe are related to climate change.
- However, more fishers in STT/J (65%, N = 14) observed changes than in STX (23.1%, N = 9) ($\chi^2 = 8.195$, $p < 0.01$).

Table 13. Changes in marine environment and species observed by fishers

Environmental Change	N	% Responses	STT/J (N)	STX (N)
Algae growth/Sargassum	5	22.7	4	1
Warmer waters	3	13.6	2	1
Changes in species cycle/behavior	3	13.6	2	1
No bait/small fish	2	9.1	2	1
Changes in species composition	2	9.1	1	1
Impacts on mangroves	1	4.5	1	0
Coral bleaching/Disease	1	4.5	1	0
Changes in currents	1	4.5	1	0
Stock rebounding (positive)	1	4.5	0	1
Warmer climate	1	4.5	0	1
More hurricanes	1	4.5	0	1
Habitat changes	1	4.5	0	1

Perceptions of Environmental and Climate Change

Key informants:

Most significant environmental changes that have occurred in the USVI in the last couple of decades include:

- Aspects of coral reef degradation (loss of coral and dead coral rubble) and loss of other habitat including seagrass and mangroves.
- Perceived reasons included disease, storms, global warming, overharvesting, overdevelopment, land-based sources of pollution, sedimentation, run-off, and decreased water quality.

“The amount of algae on the reef. There's more algae than there is live coral reef. Because of lack of grazers and then of course the pollutants in the water, the fertilizers, all that stuff” (Business).

“We depend on the sea and we have been seeing the drastic changes” (Fishery).

Perceptions of Environmental and Climate Change

Key informants:

Changes directly attributed to climate change: sea water temperatures, coral bleaching, and coral diseases.

“Elevated water temperature has adversely impacted coral reefs to the point where most of the coral reefs are dead due to bleaching events, and if not a bleaching event, then weakened and affected by other coral diseases” (Researcher).

“Every so often, we have coral bleaching. We just went through a small coral bleach episode. So, we see that due to the water temperatures often” (Fishery).

Perceptions of Environmental and Climate Change

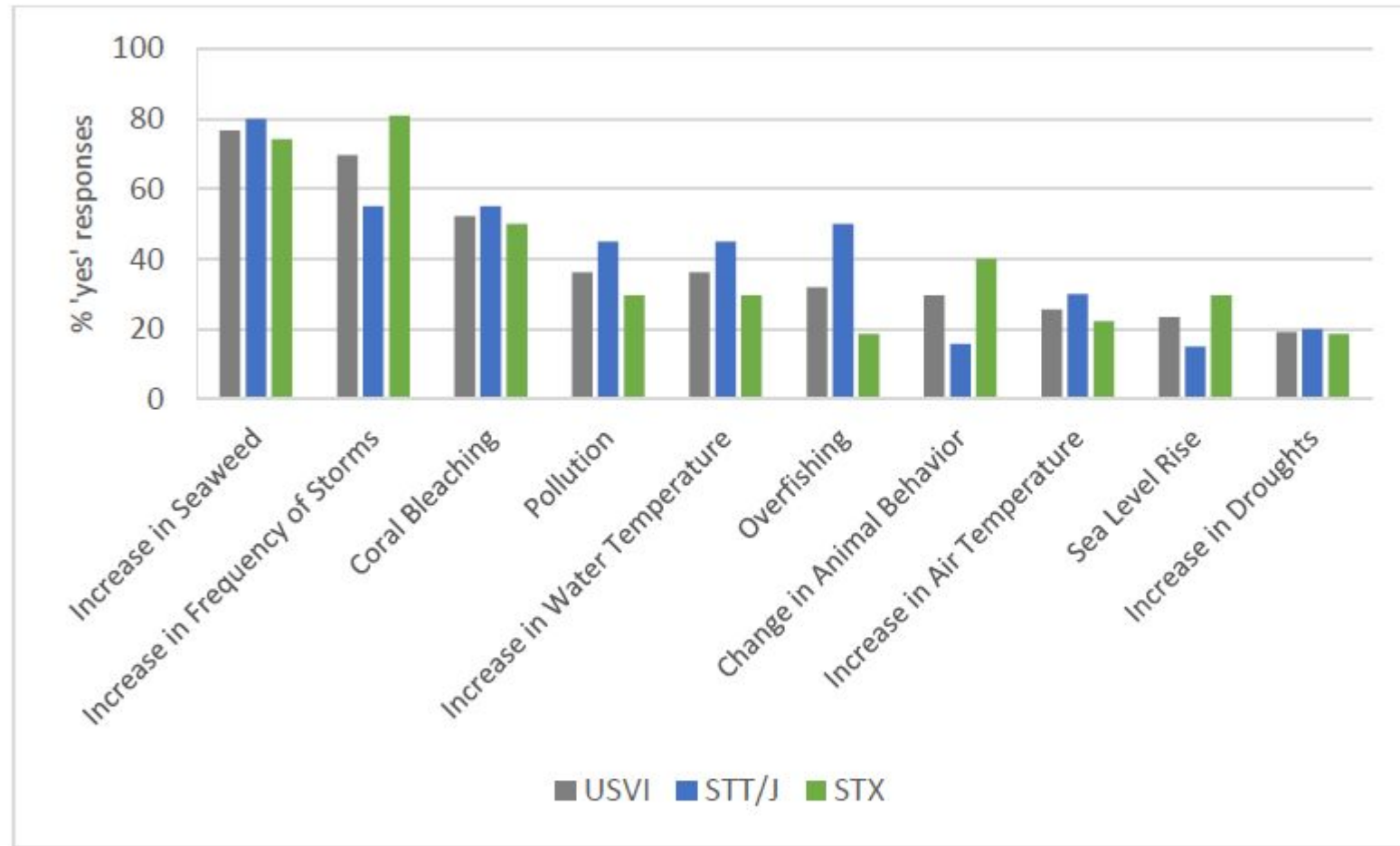


Figure 5. Frequency of 'yes' responses to climate change and anthropogenic factors fishers believe are affecting their fishing activity.

Perceptions on issues affecting the fisheries

Table 15. Issues mentioned by fishers as affecting USVI fisheries.

Issues	N	% Responses	STT/J	STX
Poor Governance/Management	16	27.6%	33.3%	22.6%
Lack of enforcement/Illegal fishing	13	22.4%	22.2%	22.6%
Lack of Education/Outreach	4	6.9%	3.7%	9.7%
Pollution	3	5.2%	11.1%	0.0%
Lack of infrastructure/support	3	5.2%	3.7%	6.5%
Overfishing/Exploitation of resources	3	5.2%	3.7%	6.5%
Sargassum	3	5.2%	0.0%	9.7%
Storms/Hurricanes	2	3.4%	7.4%	0.0%
Recreational sector/License	2	3.4%	3.7%	3.2%
Environmental impacts	2	3.4%	3.7%	3.2%
Climate/weather changes	2	3.4%	3.7%	3.2%
Lionfish	2	3.4%	0.0%	6.5%
Financial issues/Costs	1	1.7%	3.7%	0.0%
Development impacts	1	1.7%	0.0%	3.2%
Pandemic	1	1.7%	0.0%	3.2%
Total Responses	58	100.0%	100.0%	100.0%

Perceptions on management

Table 16. Fishers' perceptions on the availability of information and opportunity to influence decisions by both the state and federal levels measured as mean values on a scale of 1 to 4 and compared between STT/J and STX.

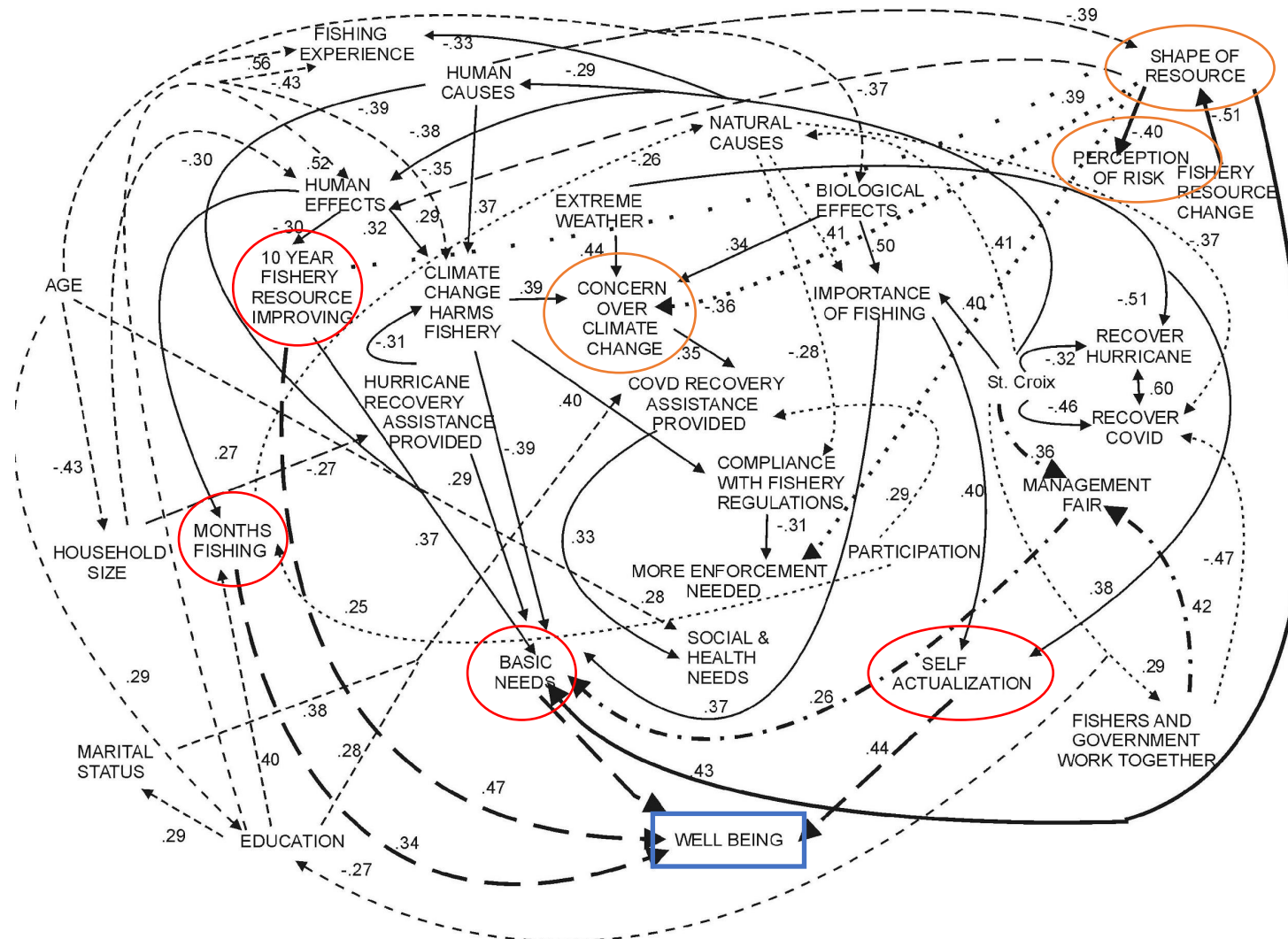
	STT/J				STX			
	N	Mean	SD	Mean	SD	Mean	SD	U
Opportunity to Influence State Gov.	47	2.49	0.975	2.43	0.811	2.54	1.104	253.000, p>0.05
Availability of Information State Gov.	46	2.41	0.805	2.25	0.851	2.54	0.761	198.000, p>0.05
Availability of Information Federal Gov.	47	2.36	0.845	2.15	0.671	2.52	0.935	216.000, p>0.05
→ Opportunity to Influence Federal Gov.	47	2.23	1.088	1.80	0.894	2.56	1.121	166.000, p<0.05

Perceptions on issues affecting the fisheries

Key Informant interviews:

- Issues currently affecting the fisheries mentioned by four stakeholder groups included lack of enforcement of the regulations, compliance with those regulations, and illegal sewage disposal and pollution from septic systems.
- The only issue currently affecting the fisheries mentioned by all five stakeholder groups was land-based runoff.

Correlations and factors affecting well-being



Final thoughts...

- Fishers' well-being as indicator of ecosystem health (relates to resource health, and perceptions of risk).
- Findings relate closely to Lenfest findings; qualitative data from key informant interviews can help interpret and provide further context to stakeholder driven conceptual models and inform EBFM efforts.
- Survey and interview efforts as a method to collect LEK, socio-economic data, and engage stakeholders iteratively – need under EBFM.

Thank you!

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