Key Informant Interview 20 USVI

Date:

Stakeholder Group: Research

Years of Experience in Occupation/Field:

Community/Area/Location: St

Speaker 1: All right, okay. Interviewee, could you talk a little bit about your involvement with USVI fisheries in your experience?

Speaker 2: Sure. My background really is as a coral reef fisheries scientist or ecologist. For a couple of decades, I've been doing various kinds of coral reef research both in Puerto Rico and the Virgin Islands. As such that I've been involved in some of the SEDAR, that stock assessment process that's used in the Southeast part of the US by National Marine Fishery Service. Some of our data have been used, or insights, with how things are going in the fisheries, or what we're seeing in different places. That's my background. I have done some projects working with some of the fishermen in the US for Virgin Islands. We've done a study of putting escape vents into fish traps to try to let by catch out, which I think was fairly successful. Actually, the council funded any fishermen who were willing to put vents into their traps. At the time, I know there were quite a few that joined in to do that. I've not followed up today, so I don't know if they're still in use or not. It'd be interesting to know. Then we've done some work with queen conch in particular, looking at home ranges, and habitat use, growth rates, mortality, that sort of thing, so tracking and tagging queen conch in St. John and in St. Croix, as well as a fishery independent survey for a couple of years of queen conch the Northeast shelf of St. Croix.

Speaker 1: Okay. I'm curious, how do you tag a queen conch?

Speaker 2: The way that we were doing it, we actually brought them back up to the boat, and we drill a hole through their shell, and then insert a little T-bar tag, which is those tags that press tags go on, that have a little plastic T on the end of them, and then super glue that to their shell. Within about five to six weeks, they cover that with new shell materials, so it solidifies that into place. All of those were numbered tags so that we could identify individual conch. Then in addition, we were doing tracking with acoustic tags. We put out receivers in an area that can detect the signals that are put out by the tags. Then we epoxy the tags onto the outside of the shell. We track some, as far as the year, so we know that the tags tended to stay on, and we could track their movement. It's more of a gross measure of where they are. But we did range testing on each of our receivers so we had an idea of how far they could detect. Then a little bit of overlap between the detection zone. To identify locations for each of them, both by doing snorkeling surveys, and picking them back up and measuring them again, and that sort of thing in subsequent months or years. Then also the data from the acoustic tracking tells us when they're in a particular area or habitat.

Speaker 1: That is still going on, they're still being tracked?

Speaker 2: In St. Croix, we continued that work around Salt River as a focused area. We also did some sampling to look at chemical contaminants in the conch. That project has really concluded. I think all the receivers have now been pulled out of that area also, so we're currently doing any of that.

Speaker 1: So interesting. Would you say that USVI coastal communities are highly dependent on fisheries in your opinion?

Speaker 2: Yeah, I would say so. I think a lot of the catch comes from either individuals who are out fishing for themselves or their families. Even some of the commercial fishing that goes on is really geared towards local, either purchase or supplying restaurants, both from an economic standpoint. There's a really high connection there.

Speaker 1: Okay. Would you say that USVI fishermen are highly dependent on fisheries for their livelihoods?

Speaker 2: I think it varies a lot. I think in [the USVI] and Puerto Rico both, the fishermen often have other jobs as well as fishing. There are some that are full-time. But an awful lot of them, and certainly a lot of the crew that go out, have other jobs that help them make a living. I would say probably boat captains would be most dependent on fishing as their main source of income.

Speaker 1: Okay. Would you say that USVI coastal communities are highly dependent on coral reefs?

Speaker 2: I would, yes. Certainly from an environmental view of things, for coastal protection from storms, that sort of thing, it's important that the reefs are there. They don't have a lot of the sort of barrier reefs. They have lots of fringing reefs that are right on the shoreline. That impact, that protection, is probably not as great in the Virgin Islands as it could be in other locations. But their fisheries certainly are almost totally based on reef species. Whether they're shallow nearshore reefs, the various kinds of snappers, or whether they're the deeper reef at the shelf edge where you find grouper spawning aggregations and that sort of thing. Yeah, I think it's largely dependent on that. I know there is a sport fishery, and lots of sport fishing that goes on with tournaments for billfish, and that sort of thing, that economically is very important to the community, but probably to mostly a subset of the community. Although, I suppose restaurants, and bars and all the people who work there and depend on them are supported anytime you bring in tourists, whether they're fishermen or whatever. But I would say reefs are really the major resource that supplies most of the natural resources that they take. Pretty dependent, yeah.

Speaker 3: Okay. Interviewee, what would you say are the major problems facing fisheries in the USVI?

Speaker 2: I think certainly if you go back 40 years, 50 years there's been some serious changes. Lots of species are over fished or depleted. Technically they're calculated to be over fished in our NOAA Fisheries specific lingo. But certainly the populations are very depleted from what they used to be. I think that is a major concern. I suspect that some of that has to do with habitat change and environmental conditions from coastal development. We know that climate change, as well as other factors, have degraded the reef habitats, that corals have died. Lots of places, the coral cover is not anywhere near what it was 20 years ago, maybe 30. It's been happening for a long time, but I think it's only been getting lots of attention in the last 20 or so years. But there's a long history of coral reef research, especially in St. Croix. You had the old Farleigh Dickinson Lab that was there with lots of research that went on back in the '70s and into the '80s. I think that the reef degradation is a huge problem. One of the things that you do hear from fishermen when you talk to them, they say, "Well, it's not our fault the fisheries are deplete. It's more to do with coastal development." It's really hard to make the argument to them that still doesn't mean that you can go as many fish as you want. Doesn't matter how they got depleted. You still have to play the hand that you're dealt right now, and you can do your part to try to recover them. I think those are the two major problems. Certainly there's a lack of enforcement in that area. There have been attempts, I think, to try to incorporate more innovative enforcement methods. You've got the National Park Service has some enforcement authority, the Fish and Wildlife folks, NOAA, law enforcement, Coast Guard. There's a lot of entities that are there, but they don't always work together to patrol effectively. I have heard lots of [snide 00:12:31] comments about the local enforcement people who would much rather sit in their office than actually be out on a boat somewhere where they might encounter their cousin or brother or somebody doing something they shouldn't be doing in the area. I think that in the situation that when you don't have enforcement, then what you really need to do is generate compliance by getting the fishermen to understand the biology. They know an awful lot about that, just their own traditional ecological knowledge. They know lots of things, although their interpretation sometimes can be a little funny. But I think getting them to understand. I think some of the processes that the council has been going through, having open [C-DAR 00:13:32] meetings with fisherman invited to talk about their own data, those sorts of things, I think have helped. I don't know, that's a whole other can of worms. Because their data that they come with aren't always the same as the data they reported. Trying to decide what you can use and what you can't is different. But I think those are the things, those depletions, the degradation, and then the lack of compliance or enforcement.

Speaker 3: If you had to rank them in order of importance, which would you say was the most important? Speaker 2: Can they all tie for first place?

Speaker 1: Yes.

Speaker 2: I suppose the depletion of the populations is probably the number one thing. I think as you've depleted groupers and snappers from the reef, you've moved more into fishing parrotfish and tang that you see in the fisherman's trucks where they're selling species. I think they've had to go to the other species that play other ecological roles in trying to keep the reef healthy. I think that would be first. The enforcement goes over everything, whether it's coastal zone

management, or specific fisheries enforcement. I would probably rank that second. Then the habitat degradation of the reefs as the third. Although, I know a lot of coral reef people who would disagree with me.

Speaker 3: Great. I know that question was focusing on some of the problems facing the fisheries. My next question is what would you say are the most significant changes that have occurred in the USVI fisheries in the last couple of decades?

Speaker 2: I do think one of the positive changes that's been happening in the fisheries at large has been to identify some marine reserve areas to try to use spatial management as an additional tool in trying to do better management of the species. I don't know that our enforcement is strong enough in those areas to really achieve all the benefits that they're trying to achieve. But I think that's a very positive thing. I do think that the fishers in a lot of ways have a better understanding of some of the effects of fishing, and maybe a better understanding of some of the sizes, or time restrictions, not fishing spawning aggregations, and that sort of thing. I think there is a better understanding of the effects that those actions have, to try to incurve the fishery. I still think in some ways economic pressure makes them act against their better knowledge, in some cases. There's still undersized conch, undersized fish that are being taken, and really no way to deal with that other than trying to get them to understand the significance that has on the fishery, and on their long term livelihood. I think that's always a tough argument on short term versus long term economic benefits from fishing.

Speaker 3: Okay. I know that you began to talk a little bit about some of these enviIntervieweemental changes when I asked you about some of the problems facing the fisheries, but my next question expands on that a little more. What would you say are the most significant environmental changes that have occurred in the USVI in the last couple of decades?

Speaker 2: I would think loss of live coral is a big part of that. The Acropora corals in particular, the branching corals, provide really important habitat for juveniles in particular of a lot of the grunt and snapper species that really make up the bulk of the catch that's being taken from the reef. I think that loss of habitat has got to be having some effect on the longevity of the populations. We're certainly seeing more areas that seem to have algal overgrowth on them that are probably driven by lack of grazers, the parrotfish, the urchins, no longer being on some of those reefs, and the coral not being there to fight for its own space. I think that's part of it. We do see areas in the Virgin Islands where you get a lot of runoff coming from land. The Salt River Canyon area is one of those in particular, as well as Coral Bay on the South side or East end of St. John. You can tell in those nearshore areas that there's lots of sediment coming off the land. That affects turbidity in the water and changes the algal composition of what's there for the species that can really grow in a more turbid and nitrified area. Those are all coastal development issues where I think the protections that are supposed to be there in coastals and management are not really there.

Speaker 3: Okay. Yeah. Have you observed any changes in the USVI fisheries and/or the enviIntervieweement that you think can be a true to changes in the local climate?

Speaker 2: Maybe. I'm afraid that climate change is one of those things that until it's happened, you can't be positive that was the effect. You can say it was predicted to happen. But until you've gone past it and you go, "Yeah, that was an effect of climate change." But anyway, certainly the increased incidences of bleaching and coral disease all seem to be related to higher sea surface temperatures, as well as degradation of water quality. I suppose the theory says that the increased number of storms that are coming through are probably climate related. It seems like there's probably more damage. There's more erosion that's happening from a lot of those storms that come through and even incidentally occur. We've seen at least a couple of hurricanes that didn't actually hit the Virgin Islands, but they generated really high surf and wave conditions that caused a lot of erosion of the shorelines, that then puts all of that sand and stuff into the reef area, and tends to bury the corals, bury those habitats, bury sea grass. One of the places that we work in the Salt River Bay, whatever it's called there in St. Croix, we were there for one of the storms that happened a couple of years ago. We could tell that about four to six inches of sand had been deposited on top of sea grass areas that we had just been in shortly before that. Sea grass is another thing that gets impacted by the increased storms that are happening and the movement of sediments and stuff into the habitats.

Speaker 3: Thank you, that was really helpful. I have two more questions and then I'm going to turn it over to Interviewer. But my next question is, in your opinion, are USVI fishers concerned about climate change?

Speaker 2: I don't know. Not really a topic I've ever discussed with anybody.

Speaker 3: Okay. In your opinion, are USVI fishery managers, researchers and decision makers concerned about climate change?

Speaker 2: Certainly researchers are. I think I would assume the managers are. Again, some of that may come back to that short term versus long term comparison, that it's maybe more important right now to worry about managing the fish that are taken from the reef than it is to worry about what the effects are going to be 20 years from now. But I would think that's on everybody's mind, and they're at least paying some attention to it.

Speaker 1: Interviewee, I have a couple of questions about relationships in the community. Perfectly fine if you feel like you're not able to answer questions about that. But I was hoping that maybe you could describe a little bit to us that relationship between fishers in the USVI. If you've had any experience, how would you describe the relationship between them?

Speaker 2: Between the fishers themselves?

Speaker 1: Yeah.

Speaker 2: Well, competitive. I would say in St. Thomas as an example, there are actually at least, I would say, three somewhat junked groups of fishers. You have the fishermen that fish out of Frenchtown, they're on the South of Charlotte Amalia. I would say they seem to be a fairly friendly bunch with each other. You don't see a lot of conflict. Although, maybe some from time to time with those folks that come in, and they sell from the market stalls that have set up there, and that sort

of thing. Then you have folks that are over on the North shore, more in the Megan's Bay Area of the island. Forgotten exactly what that little community is really called. But there's a group that fishes out of there that are quite separate, they tend to fish more to the North. Although, they all fish all over the place. Then you have a group that's fishes out the Mangrove Lagoon area. I think they probably all separate, and have somewhat different territories that are easy for them to reach. Although, I don't think it's formal. I'm curious to know if anybody would feel like somebody had invaded their fishing area, and set their traps in my area, or not. As part of that escape vent study, we did a lot of tracking of where our experimental traps were placed. That's probably something I could look into more closely for my own research, as to how separate those areas are by fishermen. But there are some gathering together in council meetings, for example. There are some arguments between the different groups, as to what they view out there as the conditions, and how they feel about regulations and that sort of thing. I haven't had quite as much experience with fisherman in St. Croix. I've really mostly had interactions with some of the folks that are conch fisherman there, and worked primarily on conch. One guy who also fished lots of deep water traps, and that sort of thing. I don't really know as much about them, but I would say they're probably appreciative of the move to island based fishery management planning and management, because they are distinct in the way that they operate, and what conditions they face, and that sort of thing.

Speaker 1: Right. Can you think of any examples of fishers get getting together to address an issue?

Speaker 2: Sort of. I don't know when it was. About probably 10 or 12 years ago, I don't know if they really existed before, they may have, but the St. Thomas Fisherman's Association really pulled together. Dr. David Olson, who had been on the island working with fisherman, he was the Fisheries Chief, or the Director of the Fish and Wildlife Office back in the '70s I suppose, was back on the island, and he became the Chief Scientist for the St Thomas's Association. I think they banded together partly to fight every management measure that the council, [inaudible 00:31:11], were putting together. But at the same time, that's who I worked with to do some of these surveys and the research with the escape vents. That research actually worked out really well. We had a string of nine or 10 traps kind of varied, but that had the experimental vent sizes in them. Then we identified a few fishermen to work with, and they would go out and set the traps. Then we would monitor the catch. We did find bycatch reduction, and release of things like tang, and surgeon fish, that are some of the minor herbivores on the reef. But also smaller fish, parrot fish, and even some of the target species that are undersized. As they started to see this reduction in bycatch ... All of this was done with David there as the local interface for this. I was in the background of project design, and we did some specific diver based studies to look at species that got out, within certain time periods, of the traps themselves. They really developed this project and they ran it. But they started to get into, not arguments, but one other fisherman going, "Well, give me a chance to fish them. Let me run them for the next month," that sort of thing. They really were willing to participate in that experiment where they felt like the results were going to benefit them and make them look better. They also did a cooperative research project mainly within their group to look at bycatch for all their different fisheries. We have a much better understanding of the bycatch from all the fisheries there in the Virgin Islands, mainly St. Thomas, that were mainly run by the fisherman. They actually extended. They were originally supposed to run about a year with it, but because actually other fisheries, like the guys and the spear fishermen who were not part of the original study, were at the meeting saying, "Well, what about my data? Why can't I submit my data to you?" [inaudible 00:34:05] or bycatch. They have had a couple of studies that they really banded together through that local cooperative and worked on. I think one of the things in St. Croix that they did was they wanted to develop a marketing center where they could bring their catch. They brought in refrigeration, and some other stuff. I'm not sure of all the details, but that comes to mind, that was something that the fishermen themselves mainly spearheaded with some support from, I think, the local Fish and Wildlife Office may have supported that. I'm not sure. I think there's a couple of good examples where a lot of that happened. When the Hind Bank Marine Reserve was established. The design was a little different from what [inaudible 00:35:13], and part of that was a trade off between the fishermen and the council, and what the council was proposing. The fishermen came back and argued for a different change to that. That was a unified effort on changing those boundaries. Then they put in the seasonal moratorium on [inaudible 00:35:42]. It's another one where the closure was supposed to start, I think, in November. That doesn't seem quite right, but anyway, there was a negotiation that maybe it was supposed to end later, but because conch is a really important food that they have for holidays at Christmas time and all, the timing was changed on that through that negotiation. Here we are again. She'll give you her opinion next.

Speaker 1: Interviewee, again, perfectly fine if you're not able to answer this question, but still in trying to gauge a little bit relationships in these communities, do you know if the fishers do get together socially? Or if there are instances like special occasions where they get together?

Speaker 2: Yeah, certainly the St. Thomas Fisherman's Association does. They have an annual softball tournament and some other events that they do for family interactions. I know that goes on. I'm not so sure about St. Croix. But yeah, they do.

Speaker 1: Okay. How would you describe the relationship between fishers and fishery managers in the USVI? If applicable, if it makes sense to make a distinction between local and federal government in your answer, that'd be great.

Speaker 2: I will preface it by saying I haven't had a lot of interaction in the last probably six or eight years with the local Fish and Wildlife folks. We've had some interaction, although I had lots more interactions with them 20 years ago. Part of that is a matter of where our research has taken place and what research that we've been doing. The more recent stuff has been more coral based, and working around St. John. Beyond getting permits and letting them know what we're doing, I haven't had a lot of fishery interactions. I think it's been a real up and down relationship, with a real us versus them mentality, probably with both the local fishery managers and with the federal managers. I think the fishers are very possessive of their resource, and their livelihood, and anything that they think is taking away from that. They somewhat understand [inaudible 00:39:34] up with that, and object to whatever's being done. I think there have been times when relationships have been better. Like I say, I think there have been some efforts by the council to try to improve relationships, and make sure that fishermen understand what they're trying to do with management and do maybe a better job of explaining it than at one time. Certainly the local Fish and Wildlife folks are involved in those efforts as well. I think that applies largely to the commercial fishing. I know that there's much that goes on with recreational or subsistence in terms of contact with managers. I think there's a lot more fishing that goes on in the subsistence fishery than we give credit for. We saw working in Fish bay on the South coast of St. John, there was house construction going on there, and we would see the construction workers on their lunch break out wading in the sea grass picking up conch, throwing them [inaudible 00:41:16]. We actually worked with one of the local schools to try to do a "save our baby conch" with them that I think was at least marginally successful, but I don't know what happened afterwards. But the discussions with the kids as to, "Yes, my brother, my dad, my uncle," brings conch home every weekend for Sunday dinner. The questions of how big they were, were they adult conch that may have spawned already? Or were they juveniles that never had a chance to contribute? I think those kids certainly began to understand what we were trying to get across to them. But it's everybody in the population that can go out, grab a few conch, and have a meal from it. I don't know, I got distracted. What was the question?

Speaker 1: No, this is great. It's a lot of really great information. I was asking you about the relationship between the fishers and the managers?

Speaker 2: I think there's not much with this subsistence fishery. Certainly there's not an enforcement element that helps to make sure that those folks understand what the size limits are, and the seasons for catch, and that sort of thing, where you do get probably a clear understanding of that with the commercial guys.

Speaker 1: Going off of the relationship between fishers and fishery managers, can you think of any examples of fishers and fishery managers getting together to address an issue?

Speaker 2: In a minor way. At one of the early SEDAR meetings, this is the stock assessment process, for finding lobster in particular ... [...] They got into the data workshop and started reviewing the data for any lobster landings. A couple of the fishermen said, "Well, those are nowhere near accurate of the numbers of lobster that are being landed." They didn't really know where the disconnect was. But the NOAA folks that were there for the stock assessment said, "Well, if you can provide us some additional data from the other captains, we'll certainly include that in our modeling." There was an openness to try to obtain some better data than what was actually being provided in the main data set that had been collected. I think some of that is from under reporting, that they purposefully do for tax reasons and stuff. But they don't understand that if you catch more and you still have the same population size, that actually means your population is healthier if you catch less. The ecological outcomes were very different from the tax outcomes of their reporting differences. I think there is some support among the fishermen for closing some of the spawning aggregations. I think they feel like it does hurt their immediate profits. But I've heard at least one instance of a fisherman who has said, "Well, since we stopped fishing the red Heine fishery, we catch them year round now, where before we caught a glut of Heine at Christmas time, or first of the year, when their spawning main occurs. But other than that, we didn't catch them much through the year." I think there's probably some thoughts like that. I don't know if they're all well formulated and stuff. Been a couple of instances like that, that I think folks have realized that some of these measures work, and they should be enforced. You do hear complaints. That's where you hear complaints from the fishermen, about lack of enforcement. Because they hear of somebody who's gone out during the aggregation, and they fished, and caught a bunch of fish and brought them in, and know that somebody should be out there stopping them from doing that if everybody else is not going. I don't know what the situation is with it now, but there used to be a system of fads, the fishing aggregating devices, that are anchored typically off the shelf edge, I think, that attract mahi mahi, and some of the tunas, and a lot of the pelagic species to those areas. At least for a long time, I think that was a program that was felt to benefit the fishermen, to have those out there and maintained. I know they've had some breakage, and losses of those through the storms. I don't know if any of them are out there in place anymore at all. But I think that was probably another effort that everybody would've been supportive of as an extra management and a fishery benefit.

Speaker 3: Thank you. I have three questions left, and these questions are about fairness regarding management decisions. Again, if you have examples that you want to distinguish between local and federal government, you can make that distinction. But my first question is, do you feel that fishery management in USVI is fair in the decisions that are made?

Speaker 2: Of course. I tend to think that populations are so depleted in most cases that it is really necessary to have some regulations. It may affect certain fishers more than others. An example might be, there were gill nets. There was a gill net fishery in St. Croix that was operating probably 15 years ago. They went through a whole process to determine, somewhat controversially ... But the local Fish and Wildlife folks had some instances where they felt there were excess catches. There were certainly species that were not very marketable that were being brought in. A lot of those were being thrown into a dumpster. A lot of those were parrot fishes coming off the reef that could be down there helping the corals out. There was a process they went through to try to figure out what was a reasonable economic payback for those nets. They paid the fishermen for their nets, and I don't know, maybe some of their livelihood. I don't know exactly what the payout was based on. But they closed that fishery because of the ecological harm that they felt like it was doing. But they tried to do it in a fair enough way so that those fishermen did not suffer a long term economic loss, simply by being shut out of the fishery, and not having any other alternative. I think there's an effort to try to make fishery management decisions fair. It may not come across to the fishermen who get affected by that, the ones that have always fished on the spawning aggregations of grouper, feeling that's closed, and those two or three months of really high catches they're losing out, so that doesn't affect the guys who fish other places with traps, or who are the yellow tail, snapper fishermen those sorts of things, and it only affects them. But I think once you get to a place with your ecosystem ecology that things are in the shape that they are, you have to take some drastic measures. If you can do that by buying out fishermen, and trying to keep them out of the fishery, or I know they closed down the number of trap fishermen licenses a few years back and there were no new licenses being issued for new fishermen fishing traps, I think there's some measures that you have to take to try to control the amount of effort that's going on out there and manage your species and try to recover them the best you can.

Speaker 3: Okay. Do you think most fishers in the USVI understand how fishery managers make these decisions?

Speaker 2: Yes and no. I do think the council tries to explain, or the local Fish and Wildlife folks, whoever's putting in management measures, I do think they try to explain the reasoning for it. I don't know that the fishermen always accept those reasons, or they just don't want those things to happen, so they don't think that it's a reasonable thing to do. To go back to this funny lobster example earlier, I think there was not an understanding that under reporting of catch is actually a bad thing from an assessment standpoint, because you don't see the amount of productivity that's actually being taken out of the fishery, and seeing that your current population can support that. There is something counterintuitive [inaudible 00:54:20] thought that, "If we tell them we're not taking as many fish, then they'll think that everything's better." I think there is that sort of lack of understanding of how the modeling works. Even in that, SEDAR meeting, the data was brought into it, but then all of the assessment modeling was a black box. It's like, "Okay, we had these data, and we're running this aspic model, and these are the results of what the population size estimate probably is, and what the catch ought to be." I think that's a disconnect that was on the stock assessment people, on the NOAA Fisheries folks, in not doing a better job of trying to explain how the modeling works. Certainly we take semester long classes to be able to run those models and understand them. But I think understanding the general concepts of them are certainly within the realm of most of the fisherman's understanding. I think there is a need to do a better job of that. I think some of that does happen. Some of that goes on, but there's probably more that could be done. I also come back again to the disconnect with the subsistence fishermen who are out there catching for themselves, and their families, and do it pretty regularly. Even the guys who just fish from shore. I know there have been a couple of attempts coupled through the NOAA Coral Reef Conservation Program to do [inaudible 00:56:20] surveys of shoreline based fishermen, although I never saw any final results or reports from that stuff, so I'm not sure how that was ever used. But they were probably done. But anyway, I think there's less focus on those guys, where in a lot of locations we're finding that the landings from the so-called recreational fishery is as high as the commercial fishery is. Maybe more attention needs to be focused on getting that message out a lot more widely than we do, and figuring how to collect data from those sectors as well.

Speaker 3: Okay. My last question is, if they exist, how do you think conflicts between fishers and fishers are resolved?

Speaker 2: Fisticuffs, or a few beers at the bar. I think there are some shouting matches that happen. I don't know if there's anything more aggressive than that. I wouldn't be completely surprised, but yeah.

Speaker 3: Okay. How about if they exist, conflicts between fishery managers and fishers. How are they resolved?

Speaker 2: Resolved, that's a tricky question. I think the fishers do come more off ... Well, I haven't been to a council meeting in a number of years now, but I used to go somewhat regularly. I think they bring their concerns to the council, and certainly voice is their opinions of things that they have problems with, or of things they're concerned with. I don't know about the resolution. I think fishers will go away and complain, to anybody that will listen, about the management, and how unfair it is to them in particular. Sometimes I think you can reason with them, and explain why something is a certain way. Sometimes you can't. They simply believe that their way of doing it is right, and you're doing things, and they take it personally. I don't know. I'd be interested to know how fisherman actually answered that question.

Speaker 1: I think that these are all our questions, Interviewee. Thank you so much. This is great. We got so much fantastic information. Is there anything that we haven't talked about that you would like to add, or any questions for us at this point?

Speaker 2: I had a couple of additional thoughts about the environmental things. Certainly invasive species are a concern. All of the problems with the lionfish. I'm sure I'm not the only person who's mentioned this. It has provided a new fishery and a new fishery target. But I don't know if the impacts that you're seeing on the reefs are worth the new species being there, but it really is there now, so I think we might as well start calling it the Atlantic lionfish instead of the Pacific lionfish, they've been there that long. There's also been invasive seagrass that's getting to be a real problem. It's a halophila species that I think is mainly a Pacific species. Although, it may be mainly a Mediterranean. I can't remember where it comes from now. Stipulacea, I think, is the species name. But anyway, it is tending to overgrow a lot of the thalassia beds. In places where it's found, it's very widespread right now. Again, unless something happens to it, some disease or something, it's going to become one of the major seagrass plants in the Caribbean. I think both of those are environmental concerns. Conch in particular do a lot of burrowing in sea grass beds where they can get through the turtle grass or manatee grass as the two primary habitat grasses in the area where they are. But they don't tend to spend as much time in a thick algal area out in slightly deeper waters in the bay that we working in, in particular. I think the thalassia actually has more of the characteristics that we see from those types of algae, that it doesn't allow a lot of sand to show through. We don't know what habitat effects that's going to have on parrot fish that tend to graze on the other sea grasses, whether they will eat it or not, whether conch can bury in those areas or not. We do see conch in it. It tends to feed on epiphytes that grow on the blades of seagrass, rather than eating the sea grass itself. As long as the same sorts of epiphytes grow on this new sea grass, they can probably feed in those areas. Whether they can use it for the rest of their habitat, we don't really know. I think that habitat change from whatever source is a pretty important thing that can really change the face of our ecosystems in the future. Hard to predict. Unless we had some really good modeling of what we think is going to happen in those systems. Interviewer? Know anything about modeling projects happening in that area?

Speaker 1: I know. Maybe a little bit. We'll see. we'll talk in like a year or so, see what happens. […]