NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
VOICES ORAL HISTORY ARCHIVES

IN PARTNERSHIP WITH
NOAA HERITAGE AND THE NATIONAL WEATHER SERVICE

AN INTERVIEW WITH TIM OSBORN
FOR THE
NOAA 50th ORAL HISTORY PROJECT

INTERVIEW CONDUCTED BY
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TRANSCRIPT BY
MOLLY GRAHAM

Molly Graham: This is Molly Graham. This is the second oral history interview with Tim Osborn for the NOAA 50th Oral History Project. The interview is taking place on Friday, December 18, 2020. It's a remote interview with Mr. Osborn in Lafayette, Louisiana. I'm in Scarborough, Maine. I thought we'd pick up where we left off last time, and that was with the Sea Grant fellowship opportunity.

Tim Osborn: Yes, it was really enjoyable. Louisiana, just like most coastal states, has the Sea Grant program. A number of my friends have now retired, but they were originally Sea Grant Cooperative Extension agents. The Sea Grant fellowship – was suggested by a friend of mine.

He said, "You should apply. You should come up here to Washington.. After a number of interviews at NOAA and in various congressional offices, I was offered a position with the office of Senator Lowell Weicker of Connecticut. He had posts on the Appropriations and Commerce Committees. He was an advocate of NOAA and on coastal programs. When I finished that year, they asked me to stay on as a staffer, and I did for another three and a half years. There was a company based in Connecticut, Combustion Engineering…which became ABB Inc. The work with ABB was an experience in working with a large corporation with worldwide operations. After two years of work with ABB, I still enjoyed the work and challenges at NOAA. It was a growing enterprise, and one that I was offered a position in NOAA headquarters. From that start, and to a very recent call I, talking with NOAA experts, university professors, and state officials in Louisiana- about nuisance flooding, coastal flooding of critical highways, coastal highways…the work of the agency grows as almost 100 million Americans now live along our coasts. It was an interesting discussion. I mean, everyone really agrees this is happening (climate change), and this is what we've got to do. How do we get ahead of it…respond to a changing climate? You want to build a highway in a flooding coastal land area….? Highways take many years to build. So if you're talking about a rapidly flooding area, increasingly with every year, how do you do that? Then, congressional offices have got to understand the timelines and to make a decision today to help people get money to States (like the Louisiana Department of Transportation and Development), to start a project that may take ten or fifteen years to finish. This was the experience as a Sea Grant fellow, working on the Hill and understanding the entire process of the administration, the states, local governments, and Congress trying to really address a global problem with real impacts at all levels of government and society. Those are the kinds of experiences that came out of it at Sea Grand that were really good. It also had me doing a lot of work on NOAA programs, NOAA projects, NOAA-funded initiatives. So I got to know NOAA a lot internally by talking and working with their leadership at many different levels and having a chance to really see what we needed to do to support them. Prioritizing was, and is, still so important…looking at how you use limited funds to address a large world of needs.

MG: In the early 1980s, Weicker came out against budget cuts to NOAA. Were you aware of his support for the agency?

TO: He did. I mean, do you remember Weicker? Have you ever heard about him?

MG: Only from my research for this interview. He is an interesting figure. He was the first Republican to come out against [President Richard] Nixon. He supported NOAA. I read about his own political party that he created, the Connecticut Party.

TO: Yes. It was an interesting contrast of his background and the stands he took in Congress in advocating for so many programs and agencies. Though he was a Republican…he was often a strong opponent to the Administrations (such as the Reagan era) that were often opposed to budget support for NOAA or for programs and organizations and research at the National Institutes of Health. His partnerships with many in Congress, of both parties, was really something not seen today…to support science and the environment and coastal programs and health and medicine. There were efforts to even just get rid of NOAA in so many different ways. Senator Weicker was one of those people that stood up and basically said, "I'm not buying it.

When he lost his bid for a fourth term in the Senate, he then turned around, formed the Connecticut Party, and became a governor. In fact, as governor as an independent, he actually pushed through and instituted an income tax in the state of Connecticut. He was a one-term governor, but he got a state, suffering from terrible deficits to one with a surplus. Generally, when he left, people perceived him as a pretty good governor. And he had been a good senator. He had his fair share of critics. However, I also saw first hand how he interacted with people on a personal level. I respected him a lot. I enjoyed the time working on the Hill and appreciated the very long hours and very hard work it takes to do the job well.

Then moving to ABB (Asea Brown Boveri, Inc with an American headquarters in Connecticut) was also very instructive. I spent two-plus years in a very large multinational corporation based in Connecticut and doing a lot of work and travel across the country. It was a good way to see the corporate side of America, just like I did the congressional side, just like I did the academic side previously at LSU.

MG: Did your time as a staffer end when Weicker lost his reelection to the Senate?

TO: Yes, it did. There were some offers to possibly stay on in Congress. But, congressional work is very nonstop, the pay is often not very high, and any sense of a normal work life is not very applicable to a staffer.

[TAPE PAUSED]

TO: Yes, moving to work with ASEA Brown Boveri was a very good opportunity and still relied on the experience of working in Congress. The firm had a Washington office. For ABB, there were operations throughout the country. Business sectors included making trains, power plants, hydro electric plants, environmental scrubbers, transformers for businesses and neighborhoods. On the corporate side, it was really interesting because it's about numbers. It's about money and loss, but it's also about getting people within your organization and outside your organization to really understand what you do, how you're doing it, how we make money, how we stay in business, and how we get business. ABB globally has a name and standing like General Electric or Westinghouse. If a business unit needed a meeting or had an issue to address in Chicago or California or Wyoming…you were expected to get on the plane and be there for that meeting.

All of it kept coming back to my still wanting to work for NOAA. Work in Congress and time spent working with a large corporation was really excellent to experience. However, I really enjoyed science and the ocean and coastal programs that you find at NOAA. There was a position that opened up at NOAA headquarters, and I was happy to be offered the job.

MG: What was your role in the company? At ABB?

TO: It was varied. Many times, it was troubleshooting. It was also working with large federal programs and organizations (US Department of Transportation, etc) and connecting ABB's business units into working with these agencies. – they did a lot with hydroelectric plants, which Bureau of Land Management oversaw in part. , We went into the Department of Transportation

and about railroads and building railcars and propulsion systems. A lot of it was just getting to know the corporation… who they are, here's what they do. Commonly, the job saw a call or meeting with …."We have this problem. Who do we talk to? How do we resolve this problem?" One thing that struck me, as seen in the career in NOAA…is the issue of education…how do things work? How do we generate and provide electricity to our Nation. How do you build a hydroelectric plant? How do you build a brand new, modernized Amtrak system going from Boston to New York? So all those things were programs and projects I worked on. I was very interested in working with so many people from across the globe withing ABB and with their corporate network. The Swiss and the Swedes were one part of the ABB organizaton… ASEA [Allmänna Svenska Elektriska Aktiebolaget] and Brown, Boveri [& Compagnie]. It was really interesting to see the mindset and approaches you would see with so many ABB members, Swiss, Swedish, German, English, South Korean, American, et al. The common focus was, how do we all work together– we want to be successful- with team members composed of people from all across the world. Fast forward to within the NOAA experience, just like I had this sea-level rise and flooding conference call this morning…we see many parties from the Federal, State, local, academic community, all working on a common issue or set of programs. I thought it was great because, in a lot of ways, this diversity of looking at people and what they do and how they're coming at it and their mindset within the NOAA career I have had, has actually been benefited a lot by having worked on the Hill, having worked for corporate America. We're very fortunate to have an incredibly diverse group of people working for NOAA. I think, going back to the very first interview, it really comes down to: we are still in the world of personal initiatives making big contributions… where a group of people of like minds can make major changes in where NOAA is going in the future. One of these is climate change. One of these, like the conference call I was on today, deals with persistent and increasing nuisance and tidal flooding and storm surge. It's really the initiatives of individuals- in and out of NOAA- that are actually sending the bureaucracy and shaping programs into directions that you could not foresee just by an organization doing it's present work. Sea levels are rising… How fast will coastal areas become flooded? What about the increase in the number of tropical storms and hurricanes, and their growth in severity? How many years before this highway becomes no longer functioning? All of these issues, you can see the work of individuals within our organization providing the means and framework of looking at these huge changes.

MG: Remind me of the position you applied for when you came back to NOAA?

TO: It was actually a position in planning. It was the policy and planning office, Office of Strategic Planning. We came up with policies, and plan formulation. It was really a huge open window of all the programs at NOAA. It also gave rise to specific efforts that I was able to work on…. The first Gulf War occurred about the time I came to NOAA. I spent time working for a NOAA team that provided smoke and plume forecasting for the oil fires in the Gulf War. We produced, based on our weather forecasts, maps of where big smoke plumes were going to be occurring across the Mideast. These were really serious issues in the exposure of military forces to these toxic smoke plumes. Providing guidance on where these events were occurring, were hopefully important in reducing the exposure to our force. So for almost a year, I was involved in that with the first Gulf War. From there, a friend made contact with me and asked – "Hey, you're from coastal Louisiana… We're trying to set up a response and restoration group dealing with spills and restoration of our coastal habitats, dealing mainly with spills." I joined in that

effort, and I saw the creation of the Office of Response and Restoration [OR&R] and the National Marine Fisheries Restoration Center. I was honored to work for an AA [Assistant Administrator] of Fisheries, Dr. Nancy Foster. With her mentorship, I participated in the development of restoration efforts along the Gulf. It was very nice work. Dr. Foster was a real leader within NOAA and has left a lasting impression on all the organization. The work along the Gulf allowed an opportunity to join the Office of Coast Survey. The work with that office has allowed to work with huge ports and waterways users, with other NOAA offices- such as CO-OPS, dealing with tides and water levels, the National Geodetic Survey about elevations and surveying, NOAA's GCOOS programs, looking at local flooding issues, ocean observations, environmental sampling. The movement to digital resources, and online presence on the web with NOAA resources, all have been big advancements in working with state and local organizations and universities.

Hurricane Katrina was a huge event that put so much light on NOAA and the Gulf. The issue of devastating surge and the intensity of hurricanes was all highlighted in this event…and even to the year before with Hurricane Ivan. This event, and the years intervening to the present, have been a time of focus on coastal vulnerabilities, the need for resiliency and the impacts of sea level rise and subsidence in increasing the risk of flooding and surge across the coasts of the U.S.

MG: Going back to that first restoration position you were talking about, was that in the hazmat office, which became the Office of Response and Restoration?

TO: The start of these programs was for many reasons. Many trust resources, such as sanctuaries, were seeing a number of incidents impacting reefs and other habitats. Oil spills were in need of being resolved and in applying compensation funds to the restoration of impacted resources. In this effort, both the National Ocean Service and Fisheries Service came together to work collaboratively in formalizing a group focused on these events, or cases. One of the more interesting of cases I was involved in were the grounding of two ships, damaging two areas of coral reef habitats in the Key Largo National Marine Sanctuary. Both groundings saw large holes being formed in the coral structures in the grounding areas. With the collection of funds from the responsible parties.... the question was then 'how do we fix damaged coral reefs?' So, as part of the project management team, we included the Corps of Engineers in Jacksonville into the effort, with their contracting capabilities and engineering expertise. Moving forward with the restoration efforts, one site was fairly deep and could be addressed with the filling of the impact crater with acceptable limestone material. The other one was much shallower water and was eroding open with time. Large custom built concrete blocks were constructed. On the top of those blocks, we put old coral material to make it look like the surrounding landscape. Each block was shaped specifically, so when you put it all together like a Lego, it filled the hole. Then we had an underwater concrete specialist out of San Francisco that came in, and they poured underwater concrete to grout the concrete blocks together and to seal the hole. This was a good example of a combined effort of many offices in NOAA to respond to the incidents and to restore the damaged resources. We also saw that a restoration program could be implemented by a responsible party, under the supervision of State and Federal trustees. One event saw an oil spill on Timbalier Island, Louisiana Working with the oil field operator and the oversight of various agencies, a restoration project on the island was undertaken in about 12 months from the time of the spill.

MG: The RESTORE act you're referring to is the Coastal Wetlands Planning, Protection and Restoration Act?

TO: Yes, CWPPRA is legislated and selects projects each year for the coastal Louisiana area. This has been ongoing for many years.

The Deepwater Horizon event saw a RESTORE program established, in which many projects are funded across the Gulf, along with science and research efforts.

MG: Can you remind you what year it was that you came to the Coast Survey?

TO: Around 2002. The Office of Coast Survey is the oldest civilian science office in America. It was chartered in 1807 by President Thomas Jefferson. The work from then to now, is to provide charting resources for the safety of ports and waterways of the Nation. The work has seen many advancements- into digital (electronic) charts, operational forecast systems (projecting future water levels, winds, etc), precision charting, enhanced hydro surveying, and responding to and recovering from tropical storms and hurricanes.

MG: I want to ask you next about the 2005 hurricane season, but what are we forgetting up to this point?

TO: Which hurricane season?

MG: 2005.

TO: Actually, 2004 was the one that started everything in terms of big hurricanes, big seasons, very destructive, powerful storms. A hurricane by the name of Ivan, Ivan the Terrible, came in the Gulf in 2004, and it was aimed right at New Orleans. It actually prompted amd evacuation order by the City. This gave rise to very large traffic jams, trying to leave the city and area. The hurricane turned to the east and, for a time, threatened the Mobile Bay area. Just before the expected landfall, it moved farther east and made landfall in the Perdido and Pensacola Beach, Florida area. This was similar in some ways to Hurricane Sally of 2020. When I got into Pensacola beach, it was pretty stunning. The high wind fields, large storm surge, damaged and destroyed a lot of structures and vessels. . We had massive sailboats sitting on top of the highway. We had boats inside of hotels. With the passing of 2004, it was very hard to believe that 2005 would be one of the worst hurricane seasons ever. Hurricane Katrina was certainly the most highlighted for it's severity and the catastrophic impacts on New Orleans and the Mississippi Coast, but this was also the year of Hurricanes Rita, Wilma and many more. It was one of the few years that all the names of hurricanes were used, and the National Hurricane Center had to use Alpha, Beta, Gamma, Delta, Epsilon, and Zeta. With many friends and colleagues across the southeast Louisiana coast and coastal Mississippi, Hurricane Katrina saw impacts that could only be described by those that stayed and survived the storm.

Our response to reopen waterways and ports was important in many ways. Port New Orleans had naval vessels and a cruise ship arrive at the Port, and start providing much needed aid and relief

supplies to the area. We had a NOAA funded hydro survey ship that was working under contract doing surveys for us over in Texas. Under NOAA Coast Survey direction, it departed Texas and headed to the mouth of the Mississippi River. At the mouth of the Mississippi River, it picked up some river pilots for helping move up the River as safely as possible. The large ship and some small field launches worked up the River towards New Orleans. With the Coast Survey navigation response teams (which came from all over the country), they started from the outside of the storm damaged area and worked inward. Coastal Mississippi ports and waterways were addressed with the small boat survey teams. Port Fourchon and the Port of Houma–Terrebonne were addressed with NRT teams, as well as the Grand Isle area. Starting in Baton Rouge, two NRT teams started downriver, surveying along the way to New Orleans.

The entire effort for reopening waterways and ports from Hurricane Katrains tood some weeks of nonstop effort. Then, Hurricane Rita…Rita makes a landfall in Southwest Louisiana (much like Laura in 2020). That hurricane did significant damage (and destruction) to Cameron Paish, Lake Charles, all the ports in the area, and included coastal areas of Southeast Texas like Port Arthur. We made a pivot in the response efforts and sent the NRTs west…just at the end of Hurricane Katrina response. That hurricane season was all consuming. No down time for anyone, each day presented a challenge of how to support the NRT teams and report out the survey findings, from areas with no power, no working communications. NRT team members camped out at the house, other navigation managers were here working from the home through the weeks of efforts. A reporter from the Washington Post flew into Shreveport. She came down in a small rental car and a one gallon container of additional gasoline. We embedded her into the work effort and came to greatly respect her work and willingness to put in long hours and the report on and highlight the challenges of coastal populations trying to recover from Hurricane Katrina. The 20025 hurricane season kept us vigilant of any storms all the way to January. For contemporary times, this appears to be the advent of much more severe hurricane season. Indeed, from 2017-2021, each of those years there has been a Category 4 or Category 5 hurricane that has made landfall on the Gulf Coast.

From Katrina, 2008 came, and we had Hurricanes Ike and Gustav. Ike was a Category 2 hurricane making landfall in the Galveston Island area. However, it was so large in size, it caused considerable flooding throughout all of coastal Louisiana and some areas east of there. Hurricane Gustav made landfall on the coast of Louisiana, with the eastern side of the storm so severe it caused consideral damage to the New Orleans and Baton Rouge areas. Hurricane Isaac in 2012 was never much of a Category of storm (barely a Category 1 for only part of a day) which saw severe storm surge and flooding of many areas of eastern Louisiana and Mississippi. I had been asked to go to New York in 2011 for the response and reopening of the Port of New York/New Jersey, from Hurricane Irene. The storm was not that severe and we worked quickly and reopened the port late in the day of the storm's passage. In 2012, I was asked to go up and work with New York again for Hurricane Sandy. I was still working on response and reopening efforts for Hurricane Isaac, so other Coast Survey members went instead. Hurricane (or SuperStorm) Sandy was a stunning event with record setting surge impacts and flooding across large areas of the Atlantic Seaboard. From these storms, to present day, the number and severity of hurricanes has been something I have seen first hand in so many areas. Hurricanes Harvey, Irma, Michael, Laura, Delta, Zeta, Ida…just to name some…all have had real impacts to coastal

communities and infrastructure. As the National Hurricane Center Director recently highlighted, 2020 and 2021 saw 85 named storms in the Atlantic and Pacific Basins. That is pretty striking.

MG: Can you talk more specifically about what your role is after a storm and what you're surveying for?

TO: For Hurricanes Laura and Delta, we saw heavy impacts to the Calcasieu Ship Channel and the Ports of Cameron and Lake Charles. This waterway and port areas are very important for the supply of energy to our Nation and in the shipment of liquefied natural gas to foreign markets. The large deep draft ships and the Lake Charles Pilots depend on surveys of the channels and offshore approach areas for safely bringing in shipments of crude oil and other cargo. As in previous years, we joined with the U.S. Army Corps of Engineers, U.S. Coast Guard, Pilots and Ports to implement a comprehensive survey response to the area. For both hurricanes, small boat NRT teams were put into the area for surveying the channels and port areas. NOAA Coast Survey also arranged for the utilization of two larger offshore vessels, to survey the ship channels outside of the main Pass. As we saw, after both storms, debris and obstructions were found…including the NOAA Ship Thomas Jefferson finding a large sunken barge with a full load of rocks in the middle of the ship channel just offshore of Calcasieu Pass.

MG: Were there lessons learned from Katrina that you applied to future storms and subsequent hurricanes in terms of the surveying work and tools used?

TO: Yes, each storm season and each storm has been a learning experience. It has been very important to do this work in (sometimes) highly impacted coastal areas, but there are real challenges. Just as we did with Hurricanes Katrina and Rita, we saw the use of field teams using travel trailers and portable generators and satellite telephones to support their work.

MG: Can you talk now about the Deepwater Horizon incident? What happened? What was your role? What was the aftermath?

TO: Deepwater Horizon was a tragedy. Eleven lives were lost and a long sustained effort to control and shut down an oil spill saw thousands involved in the work, that spanned Texas to Florida. NOAA was very active and I was involved in working with the command staff of the *Thomas Jefferson*. The 'TJ' played an important role in the use of survey technology to find and track oil plumes in the water column. As the 'TJ' made a port call in New Orleans, it was able to host the NOAA Administrator and conduct a press conference on the work and NOAA's work to address the DWH spill. This was one of many important efforts.

Another very significant collaboration was in keeping ship traffic and the coastal Gulf ports open for commerce. The Mississippi River alone, and Southwest Pass, sees over 10,000 deep draft ships moving into and out of the Gulf and River each year. It took some rapid planning and work with the Pilots, USCG and others to establish an inspection and ship hull cleaning program…for ships coming into the Mississippi River. A very large press conference was conducted at the Port of New Orleans early in the spill response, to highlight the steps that were put in place to keep ship arrivals and departures on schedule even as the spill event was ongoing.

Even Port Fourchon (on the coast of Louisiana, and a major port hub for the ships responding to the DWH spill) was a center of focus on inspecting and cleaning vessel hulls and equipment as they came to Fourchon. These efforts were seen all across the Gulf…an indication of the huge national economic impact of ports and cargo and shipping.

The start of the hurricane season raised additional issues. How could response programs and personnel and equipment be safeguarded with any possible threat of a tropical event. We did see one small tropical storm which was well to the west in the Gulf…but resulting in a couple days of coastal flooding and significant wave and weather.
MG: I want to understand better what your work looks like and how it unfolds from the moment of the hurricane or the maritime incident. Does it start with a phone call? How do you coordinate the deployment of these emergency services? Could you walk me through that?

TO: Prior to the start of any hurricane season, there are numerous meetings and coordination conferences and calls. Refreshing the list of USCG commanders, points of contact for numerous federal and state agencies as well as port authorities and waterway users. This can take place in large group meetings, or settings around a conference table with individual ports, pilots, and other responders. Even now, with the rotation in and out of various positions at various organizations…there is a need and value for reviewing the elements of hurricane and tropical storm threats, the impacts of storm surge and damaging winds, the timelines for storm forecasting and the uncertainty of where a storm or hurricane may actually make landfall.

MG: Tell me how the nature of your work changes between hurricane seasons.

TO: In some aspects, I'm busier off-season than I am on-season. Because with a storm, everything drops- all other coastal and port and waterway efforts and programs. You only address one thing, and that's the storm and responding to and recovering from the event. It really is a focused effort and one that is very time-intensive. In dealing with many events that have been very severe, a lot of lessons have been learned that only many years of these events can spotlight.
MG: Do you feel this type of work has taken a toll on you personally? Has it been difficult?

TO: Yes, sometimes. Working in areas where you see families and their homes severely damaged and/or destroyed…businesses and entire economies of an area overwhelmed with a storm. We see urban search and rescue teams working in some storm areas, trying to find the injured or fatalities. We see victims of storms being killed by carbon monoxide poisoning from portable generators. We see people with medical needs not being supported. We have seen suicides in areas impacted by hurricanes.

Hurricanes… I understand what they are. I understand that it's just like anything else in life; they don't exist because they're trying to hurt you personally. I have come to admire firefighters, police officers, other first responders, ER and Trauma medical personnel. They have jobs that are intense and stressful more so than our work during any given hurricane season.
MG: What is bringing a million more people to the Louisiana coast next year?

TO: Not Louisiana…the Gulf Coast at large. With Florida and Texas being among the fastest growing populations in the Nation, and the other Gulf States, we see possibly a million new residents moving into these areas annually. Today, we may have close to a 100 million Americans living in coastal counties…and that number is growing rapidly. Some of the considerations at NOAA (National Hurricane Center, local Weather Forecast Offices, programs serving ports and waterways, experts looking at sea level rise and flooding challenges) all are seeing their work becoming more important- with greater populations in the U.S. becoming more exposed to hurricanes, storm surge, sea level rise, global warming, larger and more valuable infrastructure and port facilities.

MG: I still have a few more questions. How are you doing on time?

TO: I'm fine.

MG: Can you tell me a little bit about Leeville, Louisiana, and the work you've been there recently?

TO: Leeville is emblematic of all the things we have discussed regarding impacts from coastal storms, hurricanes, sea level rise and climate change. It is a small community in South Lafourche Parish, Louisiana. In it's history, Leeville was a busy area with cotton fields around the area. Later, with the oil and gas era, large oil fields were established, of which Leeville was a part of the economy. Shrimping and fishing and hunting were also a part of its rich and diverse history.

Today, through decades of sea level rise, subsidence of the coastal landscape, numerous storms and hurricanes - such as Hurricane Zeta in 2020 and Hurricane Ida in 2021- the community has little to no residents. It's infrastructure has been damaged or destroyed numerous times, and the diversity of the area has been reduced to docks supporting the oil and gas industry, a few boat ramps and some sport fishing support. Where we once visited a well known cemetery in Leeville, it is now open water and part of Bayou Lafourche. Both Hurricanes Zeta and Ida were very destructive…and were events that saw a continued transformation of the community, even it's loss of being a community at all.

MG: What are the impacts on the people living in these areas and the communities?

TO: They're leaving or have left. In fact, that's one of the things that this discussion earlier this morning was talking about. Cameron Parish, which is below Lake Charles in Southwest Louisiana, and one of the States largest land parish – has no flood protection and seen repetitive impacts of hurricanes and flooding. Its elevation is growing lower and it is becoming more flood-prone every year. Today. the parish may have a population of five to six thousand. Residents and businesses have been moving from the area, to less risky coastal or inland areas. Terrebonne Parish, which is not too far from Leeville, is one of the other largest land parishes in the state. Today, it has ninety-two percent of its land area that's uninhabitable… only eight-percent of the Parish is where you see residents and communities. Five to seven parishes in southeast Louisiana, by 2050 and 2100, will likely see the majority of their land areas at or below sea level in elevation. Coastal parishes like Plaquemines (just below New Orleans and

stretching along the Mississippi River to the Gulf) have seen populations that are being reduced significantly- likely to about 20,000 today. The adjacent parish, Jefferson Parish, with a very robust flood protection system in place, has 20 times the population of Plaquemines Parish.

MG: There's probably not enough room on my hard drive to cover everything about your career, but is there anything I've forgotten to ask you about in terms of your career? What are we missing?

TO: NOAA has been a place that has seen some really terrific people that I've had a chance to learn from. Dr. Nancy Foster was a real leader, scientist, administrator. Add to this Margaret Davidson, the many leaders of Coast Survey as David MacFarland, Gerd Glang, Shep Smith, Richard Brennan, and many others. Craig McLean of NOAA's OAR has been exemplary, from his days as a NOAA Corps Officer to a senior member of NOAA's leadership. Charlie Challston, Dave Zilkowski, Juliana Blackewell of NOAA's National Geodetic Survey…in their bringing the world of elevations and a changing earth to a range of resources that can be used by all. Mike Szabados and Richard Edwing, of NOAA's Center for Operational Oceanographic Products and Services…one of the most important resource centers today to educate everyone on the science of seal level rise and severe coastal inundation. Ken Graham of the National Hurricane Center has been a good friend for many years. His work in outreach and education and the protection of coastal populations has been vital…and paid off significantly with the greatly reduced number of injured and killed from hurricanes and tropical storms in the last many years. In many ways, the personal initiatives of those at NOAA have, and continue to, shape the mission and direction of the science and programs of the agency.

TO: Okay. All the best to you. I'll talk to you in a bit. Let me know if there's anything else. Thank you.

MG: Thanks, Tim. Bye-bye.

TO: Bye.

----------END OF INTERVIEW----------

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