



Hi, The audio is over the phone; dial toll-free (US or CAN): [1-877-708-1667](tel:1-877-708-1667), and passcode is 7028688#

Knowledge, attitudes, and beliefs of communities near reefs: The socioeconomic component of the National Coral Reef Monitoring Program



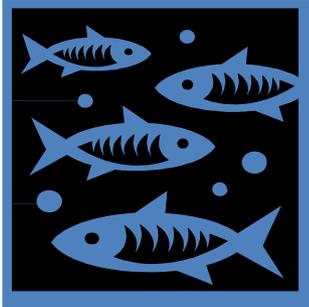
November 29, 2016

Peter Edwards NOAA/CRCP
Matt Gorstein NOAA/NCCOS
Jarrod Loerzel NOAA/NCCOS
Arielle Levine NOAA/CRCP





National Coral Reef Monitoring Program



Biological
Indicators

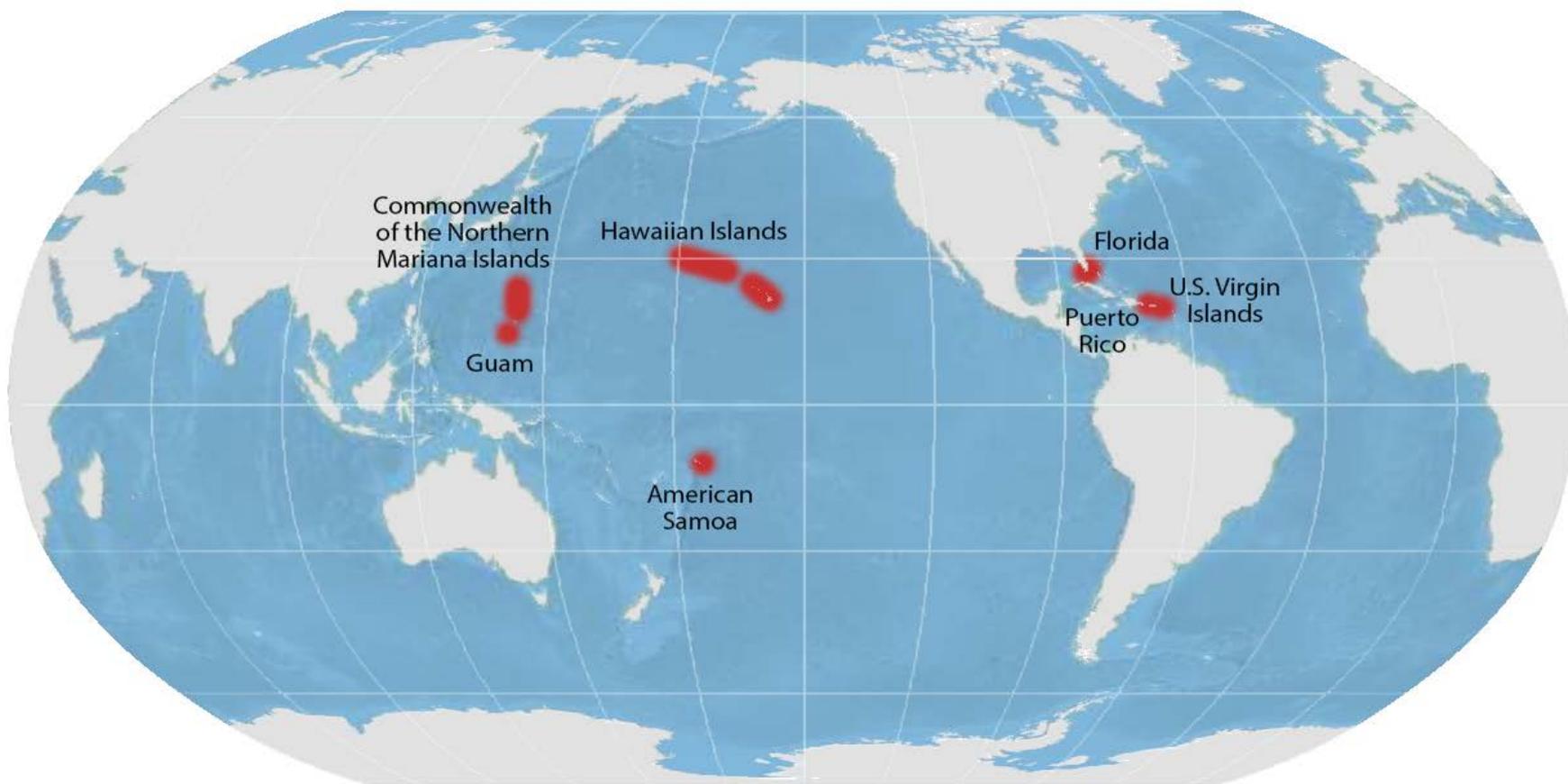
Climate
Indicators



Socioeconomic
Indicators



US Coral Reef Jurisdictions



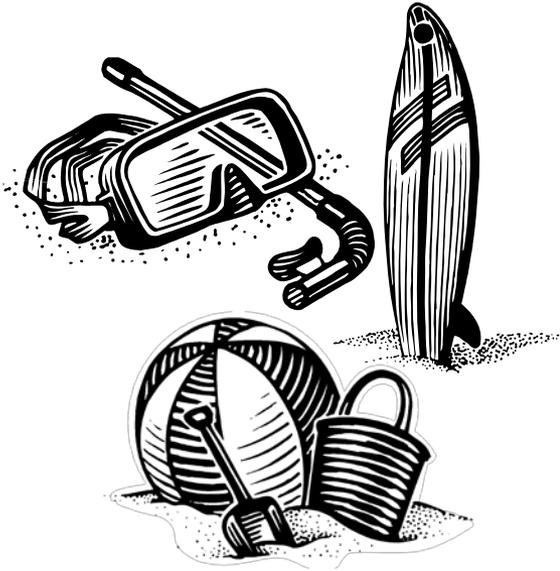


Socioeconomic Monitoring Approach

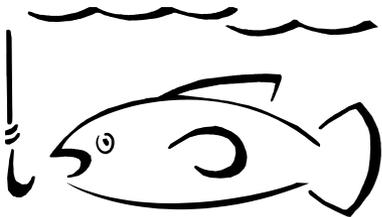
- ❖ Data collection occurs through
 - ❖ Surveys of residents in coral reef jurisdictions
 - ❖ Synthesis of existing socioeconomic data
- ❖ Resulting data will feed into several products
 - ❖ Social science database
 - ❖ Data products such as infographics, posters, presentations, and publications
 - ❖ NCRMP report cards



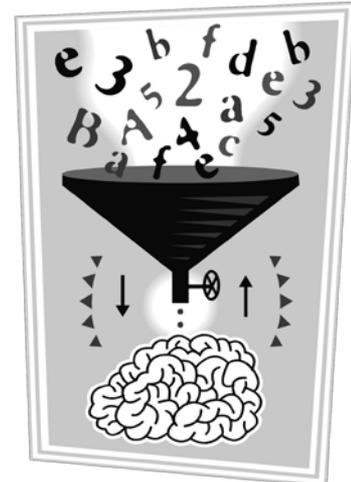
Examples of the types of data we are collecting



Use of coral reef resources



Population change



Knowledge, attitudes, & perceptions of coral reefs and coral reef management



Survey Methodology



- ❖ Core module vs. jurisdiction specific module
- ❖ Stratified random sample of adult residents in the jurisdiction representative of population demographics (age, race, sex, income)
- ❖ Survey mode (phone, face to face, internet) and language(s) are jurisdiction specific



Indicators for NCRMP Social Monitoring

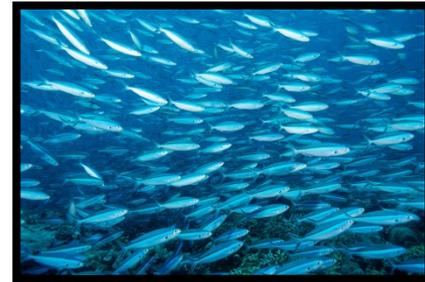
- * Participation in reef activities
- * Perceived resource condition
- * Attitudes towards coral reef management strategies and enforcement
- * Awareness and knowledge of coral reefs
- Human population changes near coral reefs
- Economic impact of coral reef fishing to jurisdiction
- Economic impact of dive/snorkel tourism to jurisdiction
- Community well-being
- * Cultural importance of reefs
- * Participation in behaviors that may improve coral reef health
- Physical infrastructure
- * Awareness of coral reef rules and regulations
- Governance



Why do we need social monitoring?



Coral reefs are highly valuable ecosystems



We need to track management success and public support

Coral reefs offer many benefits to society



NOAA CORAL REEF CONSERVATION PROGRAM

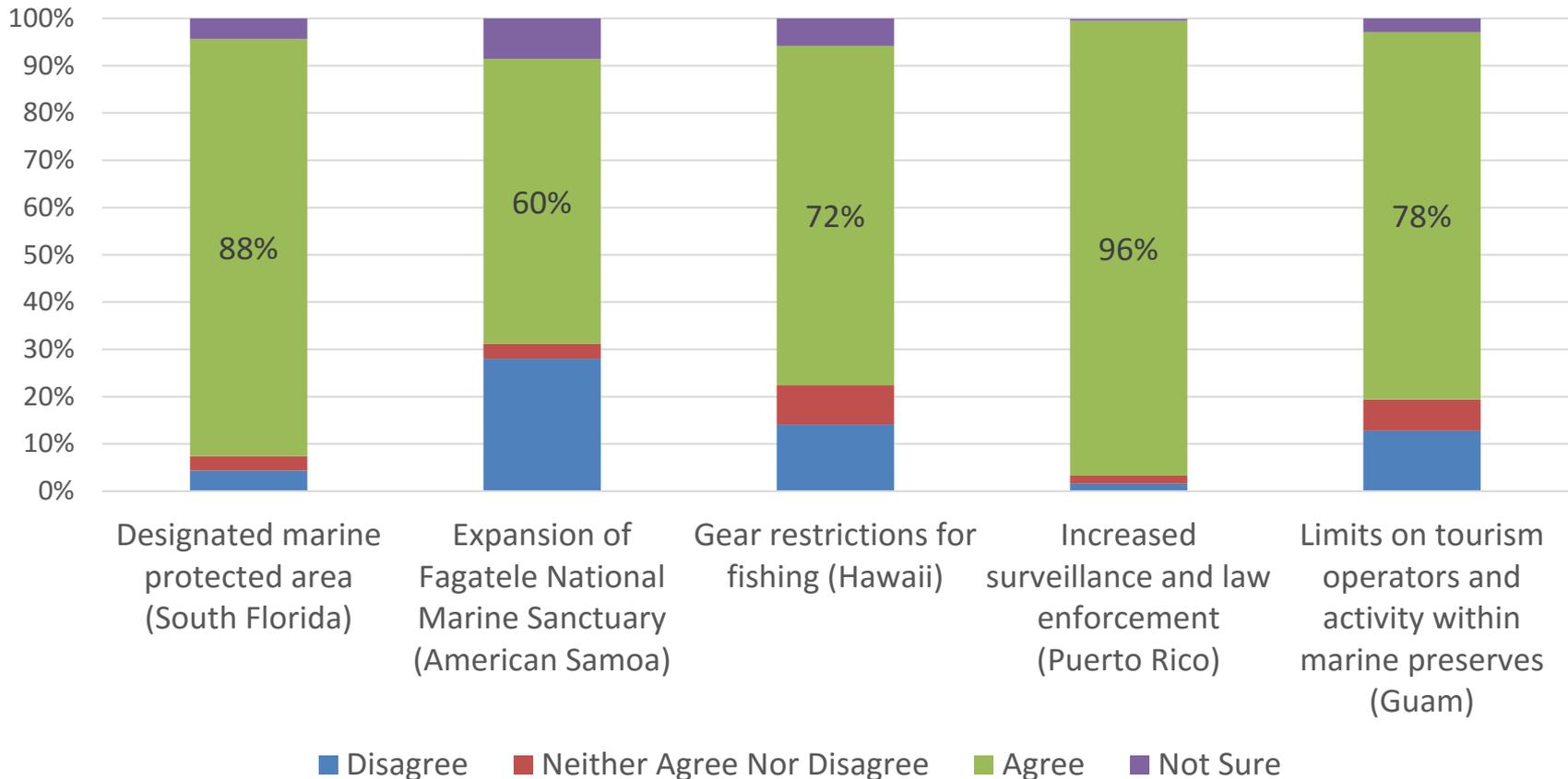


RESULTS





Examples of Resident's Perceptions of Management Measures in Each Jurisdiction





Management Index

	Management Index
South Florida	76.13
American Samoa	64.51
Hawaii	74.56
Puerto Rico	81.09
Guam	72.22

* = statistically significant at the 10% level;

** = statistically significant at the 5% level;

*** = statistically significant at the 1% level

- ❖ Higher index scores indicate more agreement with management
- ❖ Support for management is fairly widespread
- ❖ Puerto Rican respondents were statistically significantly more likely to respond more favorably to management options when compared to all other jurisdictions***



Change in Condition Index

	Last 10 Years Condition Index
South Florida	35.02
American Samoa	45.99
Hawaii	41.17
Puerto Rico	34.46
Guam	44.46

* = statistically significant at the 10% level;

** = statistically significant at the 5% level;

*** = statistically significant at the 1% level

- ❖ Higher index scores indicate a more “positive” perception
- ❖ Perceptions concerning the change in the condition of marine resources is largely negative
- ❖ American Samoan respondents were more likely to have a more positive perception concerning the change in the condition of marine resources over the last 10 years when compared to all other jurisdictions***



Threat Familiarity Index

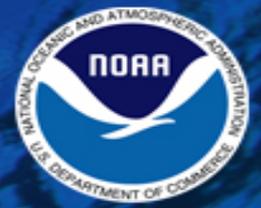
	Threat Familiarity index
South Florida	67.82
American Samoa	67.24
Hawaii	67.60
Puerto Rico	56.74
Guam	59.99

* = statistically significant at the 10% level;

** = statistically significant at the 5% level;

*** = statistically significant at the 1% level

- ❖ Higher index scores indicate more familiarity with coral reef threats
- ❖ Puerto Rican respondents were statistically significantly more likely to be LESS familiar with the various threats posed to coral reefs when compared to all other jurisdictions***
- ❖ Guamanian respondents were statistically significantly more likely to be LESS familiar with the various threats posed to coral reefs when compared to all other jurisdictions*** (except Puerto Rico)



Education and Marine Resource Condition Perceptions

Guam Resource	Did not complete college		Completed college		Statistical test for difference	
	n	Mean	n	Mean	t	p value
<i>Current Conditions</i>						
Ocean water quality	537	3.45	131	3.36	0.89	0.37
Amount of coral	442	3.00	103	2.79	1.85*	0.07
Number of fish	492	3.23	114	2.95	2.59**	0.01
Number of turtles	360	2.46	85	2.76	-2.31**	0.02
Beach quality (clean, no litter)	546	3.28	132	3.19	0.91	0.36
<i>Change in conditions over last 10 years</i>						
Ocean water quality	526	3.04	129	2.74	2.83***	<0.01
Amount of coral	441	2.77	103	2.50	2.27**	0.02
Number of fish	472	2.92	110	2.66	2.20**	0.03
Number of turtles	335	2.61	80	2.68	-0.51	0.61
Beach quality (clean, no litter)	532	3.16	127	2.98	1.67*	0.10

* = significant at the 10% level;
 ** = significant at the 5% level;
 *** = significant at the 1% level



Management Index and Threat Familiarity

Threats to Coral Reefs in Guam	Management Index ≥ 75		Management Index < 75		Statistical test for difference	
	n	Mean	n	Mean	t	p value
Climate change	382	3.39	249	3.30	0.98	0.33
Coral bleaching	381	3.15	253	3.00	1.67*	0.10
Typhoons, storms, and other natural disasters	382	3.78	250	3.69	1.18	0.24
Pollution from stormwater, sewage, fertilizer and other chemical runoff	382	4.13	253	4.04	1.80*	0.07
Trash/littering	382	4.13	253	4.04	1.38	0.17
Increased coastal/urban development	379	3.53	251	3.25	3.08***	<0.01
Invasive species	381	3.20	252	2.94	2.90***	<0.01
Too much fishing and gathering	380	3.58	251	3.44	1.77*	0.08
Damage from ships and boats	379	3.27	252	3.15	1.34	0.18
Sediment runoff into the ocean from fires	381	3.33	250	3.09	2.63***	<0.01
Damage from small watercraft (windsurfing, kiteboarding, kayaking, paddling, jet skiing)	379	3.11	251	2.96	1.80*	0.07

* = significant at the 10% level;

** = significant at the 5% level;

*** = significant at the 1% level



NOAA CORAL REEF CONSERVATION PROGRAM

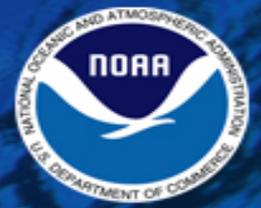


- ❖ Atlantic/Caribbean vs. Pacific
- ❖ More education = more negative perception of marine resource conditions
- ❖ More familiarity with threats = more support for management
- ❖ Longer residence in a jurisdiction = more negative perception concerning the change in the condition of marine resources
- ❖ Fishing to sell their catch = more negative opinion concerning MPAs





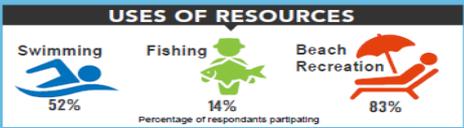
NOAA CORAL REEF CONSERVATION PROGRAM



CONNECTIONS BETWEEN CORAL REEFS & COASTAL COMMUNITIES

NOAA's Coral Reef Conservation Program monitors the biological, socioeconomic, and climate conditions of US coral reef areas and communities. This includes collection of socioeconomic variables including demographics, human use of coral reef resources, as well as knowledge, attitudes, and perceptions of coral reefs and coral reef management through the use of surveys and existing data. The takeaways below are based on the survey results for Puerto Rico.

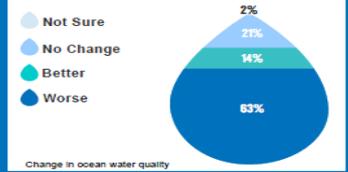
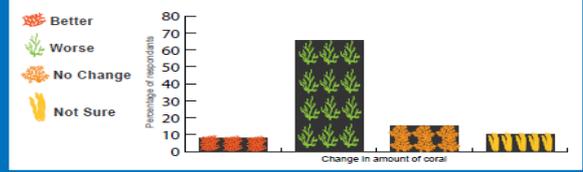
TAKEAWAYS FROM PUERTO RICO



TENURE & CONDITION

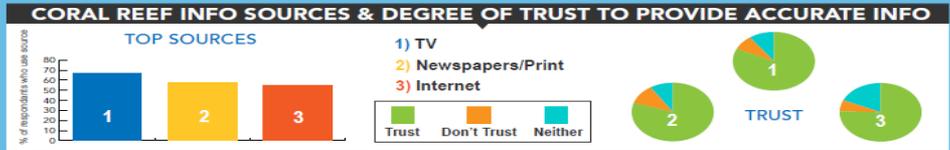
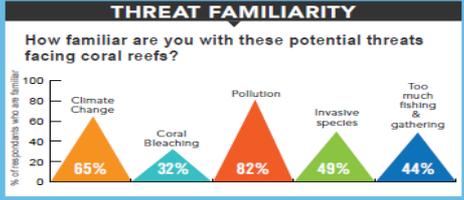
Years of residence impacts perceptions of marine resource conditions. Lifelong residents of Puerto Rico are more likely to have a more negative opinion concerning the change in the condition of marine resources over the last 10 years.

PERCEPTIONS PARTICIPANTS WERE ASKED HOW THE AMOUNT OF CORAL AND CONDITION OF OCEAN WATER QUALITY HAS CHANGED IN THE PAST 10 YEARS...



VALUES & AWARENESS

- Puerto Rican residents who agreed that "coral reefs are important to Puerto Rico's cultures" were more likely to participate in more marine activities and participate in pro-environmental behavior.
- Puerto Rican residents who agreed that "coral reefs protect Puerto Rico from erosion and natural disasters" were more likely to respond more favorably to management options and be more familiar with the various threats faced by coral reefs.



The survey was conducted for a random stratified sample of households in the Ponce, Aguadilla, Caguas, Mayaguez, Pabro, Guayama, Arecibo, Bayamon, and San Juan regions of Puerto Rico in the year 2015. In comparing the sample to the total population of Puerto Rico, the data were determined to be representative and therefore the results are generalizable to the entire population of the jurisdiction. Data were collected through the telephone random digit dial survey method, and the total sample size for this survey was 2,553. The survey effort is used in conjunction with the collection of existing secondary data to monitor the socioeconomic conditions of the coral jurisdictions over time. For more information, please see the NORMAP Socioeconomic Component project page at <http://www.coris.noaa.gov/monitoring/socioeconomic.html>.

Communication Products

Puerto Rico infographic



Implications

- ❖ First time integration of multiple scientific disciplines to monitor coral reef health and coastal communities over time
- ❖ Collection of baseline human dimensions and socioeconomic data
- ❖ Understanding the social, economic, and cultural value of coral reefs
- ❖ Understanding the complex relationship between humans and the environment



Next Steps

Jurisdiction	Geographic scope	Year
American Samoa	Island of Tutuila	2013-14
Florida	Martin, Palm Beach, Broward, Miami-Dade, Monroe Co.	2013-14
Hawai'i	Islands of Kauai, Maui, Moloka'i, O'ahu, Hawai'i, Lana'i	2014-15
Puerto Rico	Islands of Puerto Rico, Vieques, Culebra	2014-15
CNMI	Islands of Saipan, Tinian, Rota	2015-16
Guam	Entire island of Guam	2015-16
USVI	Islands of St. Croix, St. Thomas, St. John	2016-17



Gap Year (2017-2018)

- ❖ Indicator Development
 - ❖ Combination of primary and secondary data
- ❖ Focus Groups
 - ❖ Refining survey questions/methods
- ❖ Technical Memorandum
 - ❖ All 7 jurisdictions
- ❖ Data visualization
 - ❖ Infographics, story maps, web-based
- ❖ Re-engage jurisdictional partners
 - ❖ How is data being used, identify gaps
- ❖ Merge Socioeconomic, Biological, and Climate data streams



Project Team

- ❖ Peter Edwards
- ❖ Arielle Levine
- ❖ Jarrod Loerzel
- ❖ Matt Gorstein
- ❖ NCCOS social science team
- ❖ Jurisdictional management agencies
- ❖ Key jurisdictional stakeholders
- ❖ CRCP and NMFS management liaisons





Thank you



For more information, please contact:

Peter Edwards, NOAA/CRCP, at Peter.Edwards@noaa.gov

Jarrod Loerzel, NOAA/NCCOS, at Jarrod.Loerzel@noaa.gov

Matt Gorstein, NOAA/NCCOS, at Matt.Gorstein@noaa.gov

Arielle Levine, NOAA/CRCP, at Arielle.Levine@noaa.gov

web-portal: <http://www.coris.noaa.gov/monitoring/socioeconomic.html>