

What Sea-level Rise?

An Ethnographic Account of Dare, Tyrrell, and Hyde County Residents' Observations About Environmental Change

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Collecting local voices ... in their own words

This community engagement project was made possible by

- Z. Smith Reynolds Foundation
- ECU graduate students in anthropology and sustainable tourism
- Local residents who talked to us
- Special thanks to research assistants
Jessica Handloff and Evan Fulks





Cultural Anthropology

- participant observation as a framework for learning about others
- understand others from their point of view

→ Understand why people do what they do

Basic definition of culture

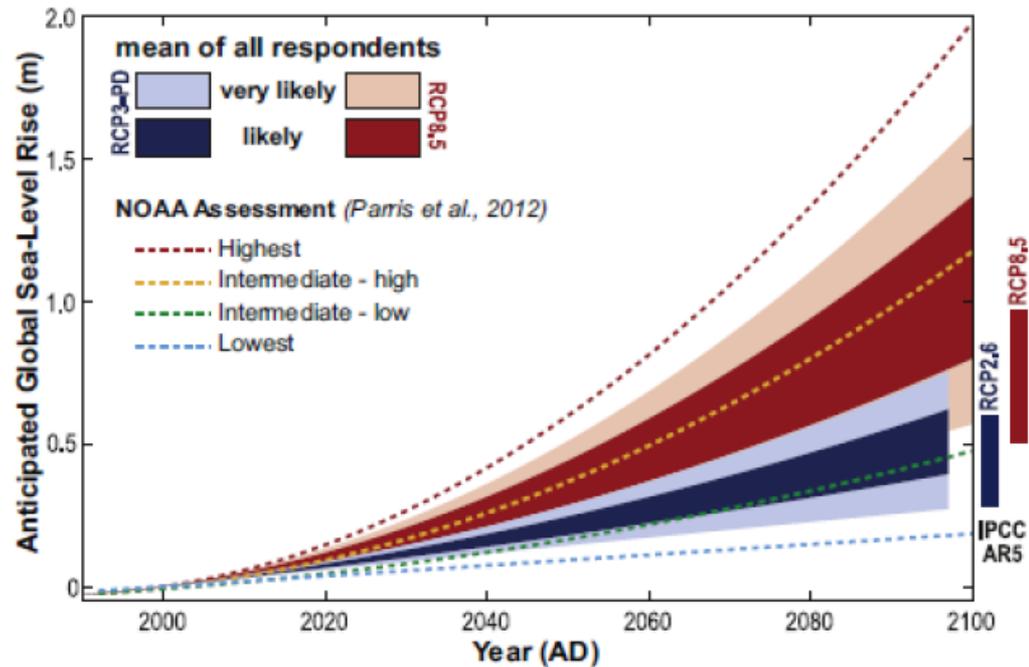
Culture is the set of
learned behaviors,
beliefs,
attitudes,
values,
and ideals
that are characteristic of a particular society or
social group.

Lets take all this to Eastern North Carolina...



The challenge

- Scientific insights about climate change and sea-level rise are widely available.
- But local communities are reluctant to address the pending changes.



(Horton, Rahmstorf, Engelhart and Kemp 2014)

Measuring reality

Sea-level rise increases the **frequency and magnitude of flooding in low-lying areas.**



Example by Ezer and Atkinson (2014):

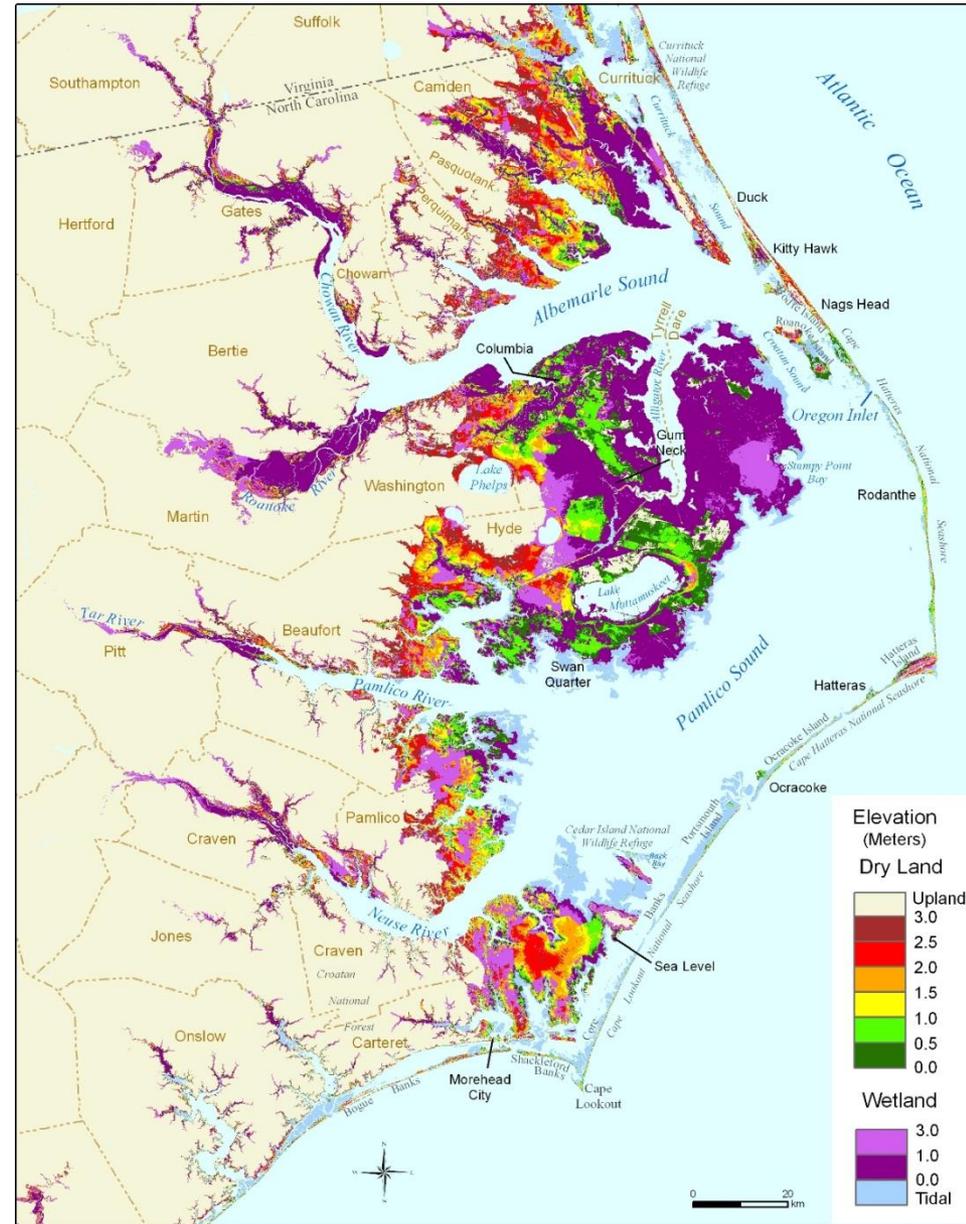
Wilmington, North Carolina
experienced nuisance flooding

2.5 days per year on average between 1938 and 1970

28 days per year between 1991 and 2013

Sea-level rise predicament in NC

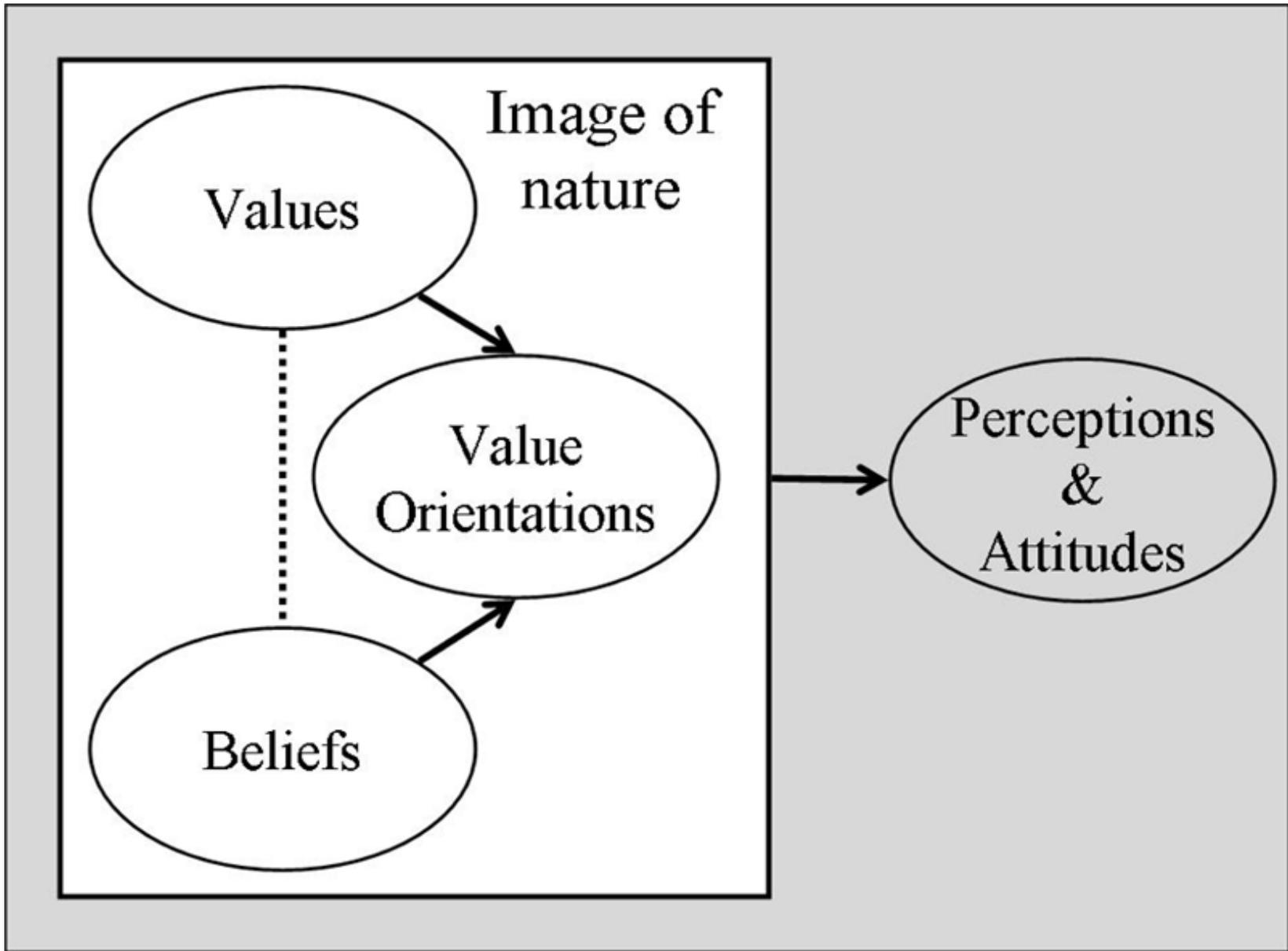
- Polarization of opinions about
 - the current state of the natural environment and
 - necessary remedies for coastal management
- Deep distrust in the objectivity of science:
 - North Carolina State House Bill 819 in 2012



Elevations of Land Close to Sea Level

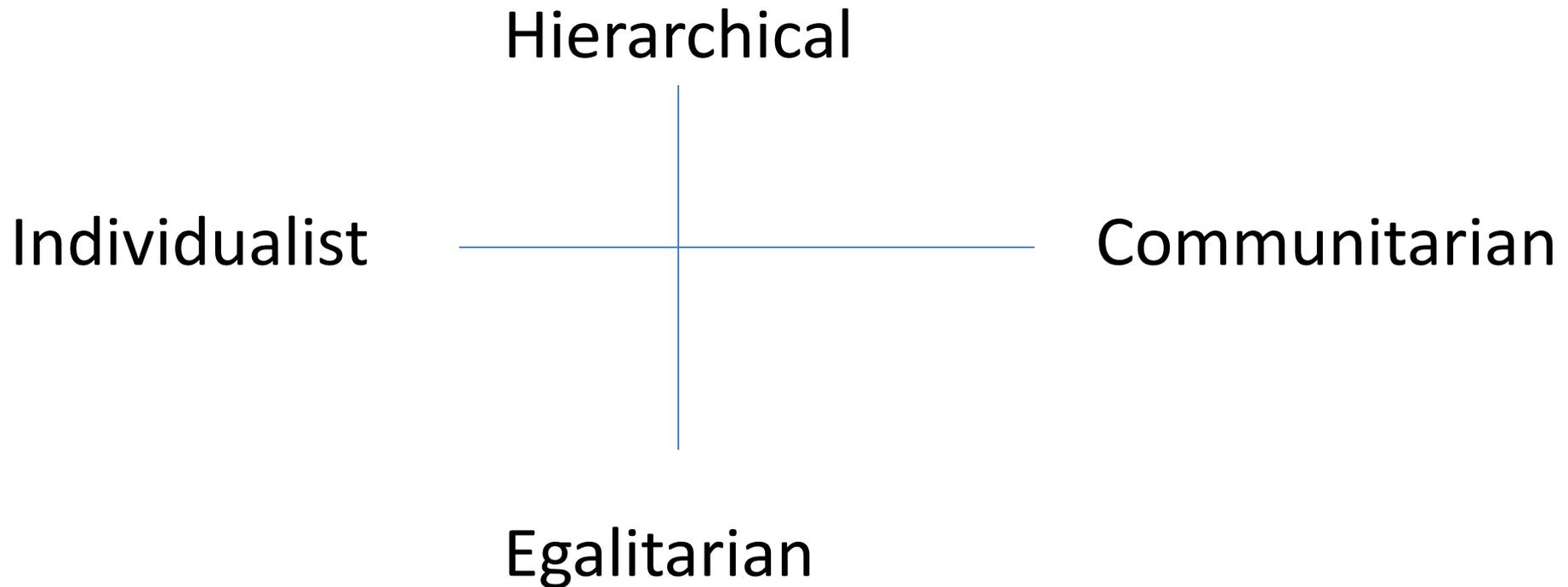
Elevations are above spring high water, which is the average high tide during new and full moons, and approximately the inland boundary of tidal wetlands. This map is a general graphical representation of elevations in the area depicted, not designed to estimate the precise elevations at specific locations. Actual elevations at specific locations may be 30 cm above or below the elevation shown.

Source: J.G. Titus and J Wang. 2008. "Maps of Lands Close to Sea Level along the Mid-Atlantic Coast". US Environmental Protection Agency.



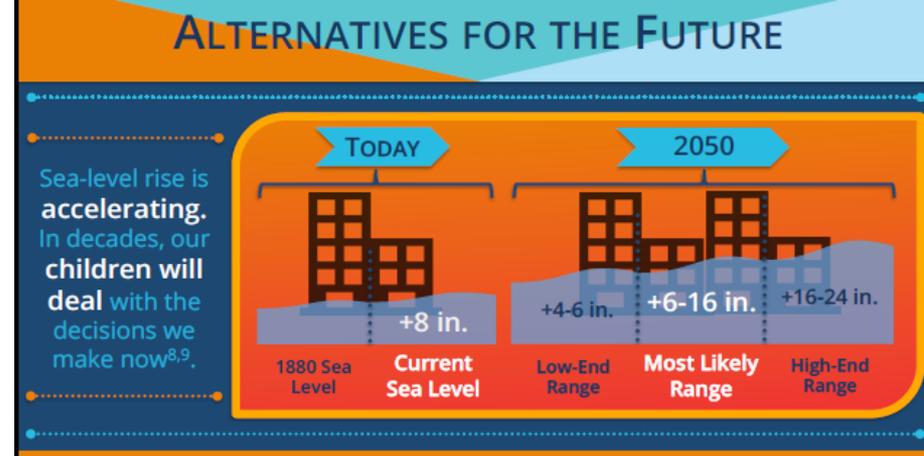
Distribution of risk perceptions as a function of cultural identity-protective cognition

(Kahan et al. 2008 in reference to Cultural Theory of Risk by M.Douglas)



Explanations for reluctance

(not a complete list)



Graphic: Brochure for NC town managers based on NOAA project

- Different understanding of risk (by scientists, community leaders, and local residents)
- Different understanding of the value of nature
- Different understanding of vulnerability
- Different understanding of resilience
- Social capital and collective action (Adger 2003)
- Economic interests override sustainability goals

Specific community engagement project designed by C. Avenarius, funded by Z. Smith Reynolds was titled:

**Restarting the Dialogue About Coastal
Management Policies:
Understanding Perceptions of
Environmental Change
Among Residents of the Outer and Inner Banks**

Perceptions about the changing natural environment:

- What kind of changes have you noticed in the natural environment over the years?
- What are your viewpoints about best practices for coastal management?
- What are your suggestions to ensure the long term health of the local economy?



Assumptions

- Eastern North Carolina residents have a thorough understanding of the environmental changes around them
- (divergent) values rather than lack of knowledge are responsible for the avoidance of conversations about sea-level rise
- Conversations take place among small groups of community members
- Ethnographic research methods can make a useful contribution to the debate

Project Goals

- To give local residents who are currently not part of the elected political leadership a forum to **voice** their opinions.
- To **compare and contrast** opinions by their distributions among gender, age, ethnicity, occupation, and location of residence.
- To stimulate **reflection and interest** among local residents in thinking and talking about their natural and economic environment.

Ethnographic research methods

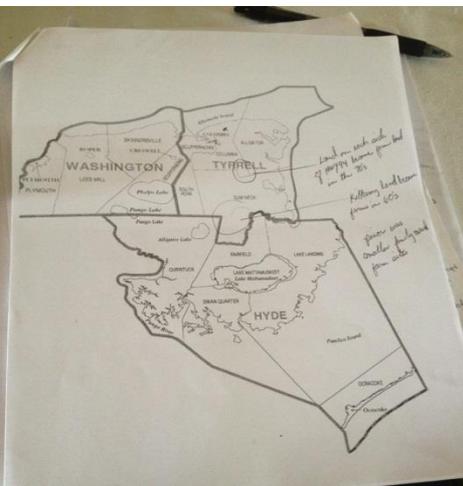
Participant observation and conversations

- Volunteer in the community
- Long time involvement (3 months and longer)
- Listening, learning
- Systematic data collection based on semi-structured interview instruments

Collecting voices

Mixed method data collection

- average length of conversation: 60+ minutes
- open ended questions (no prompts): descriptions about observed environmental changes since childhood
- sorting task: allocation of tax money to a set of projects
- sentence completion: evaluation of alternative energy projects
- ranking tasks: attitudes towards nature



Finding conversation partners

- At Rotary clubs, Lions clubs, American legion, voluntary fire fighter meetings, etc.
 - At bible study meetings, church gatherings
 - By volunteering at community events and in schools
 - By “hanging out” at gas stations and convenience stores
- Building a **quota sample** to capture diversity by gender, age, ethnicity, occupation, location



How many voices ?

- in Dare County: 210 conversations in 2013
- in Tyrrell County: 85 conversations in 2014
and an additional 26 conversations in eastern Washington County
- in Hyde County: 45 conversations in 2014

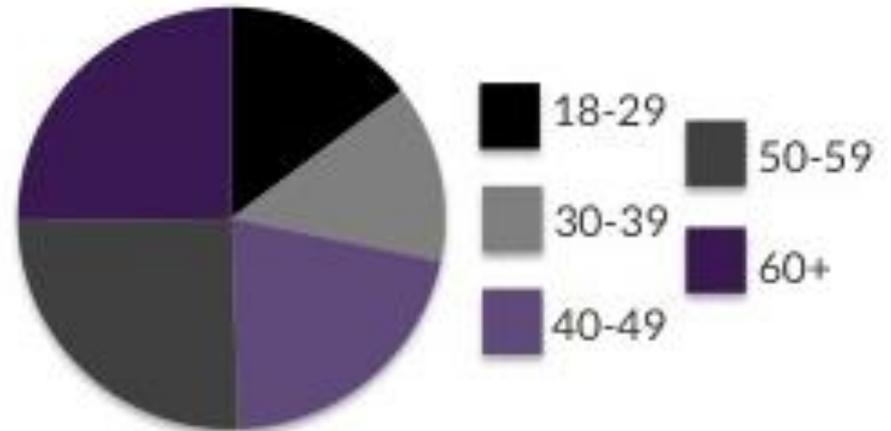
Participant Demographics in OBX

42%

Gender Distribution



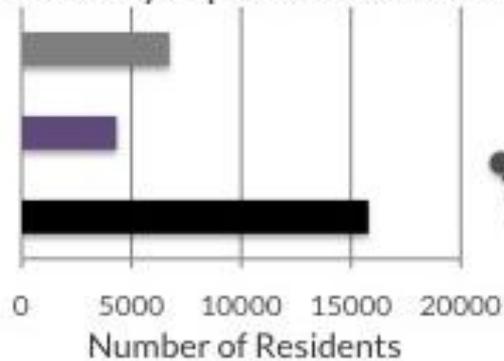
Age Distribution



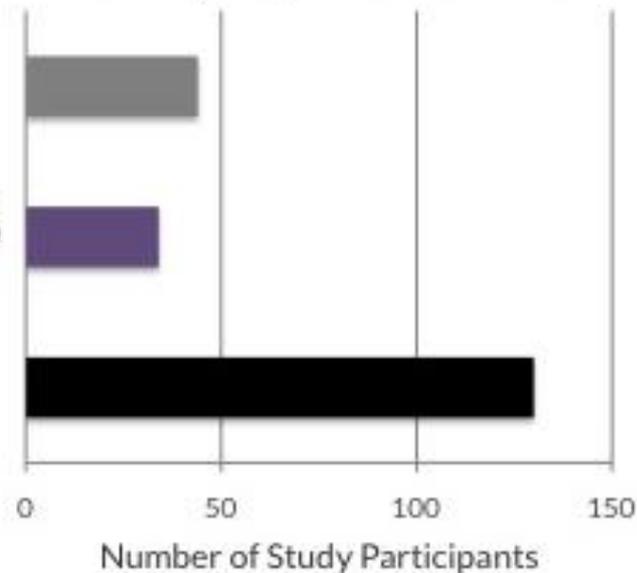
... participant demographics in OBX

Location Distribution

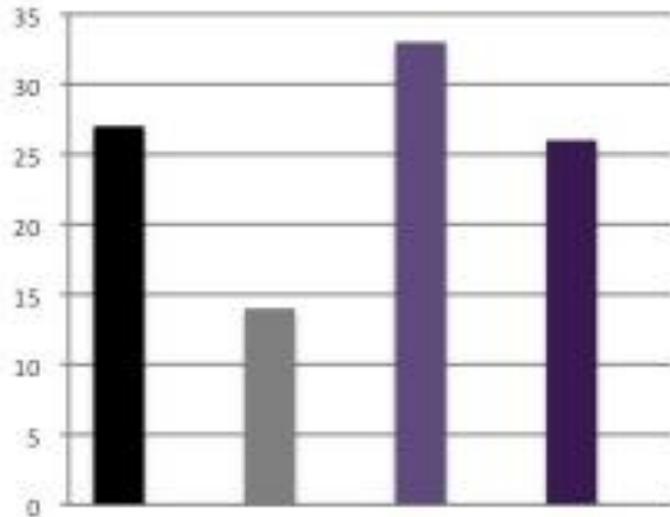
Dare County Population Distribution



Study Sample Distribution



Percentage of Lifetime Lived in Dare County



27% Born and Raised

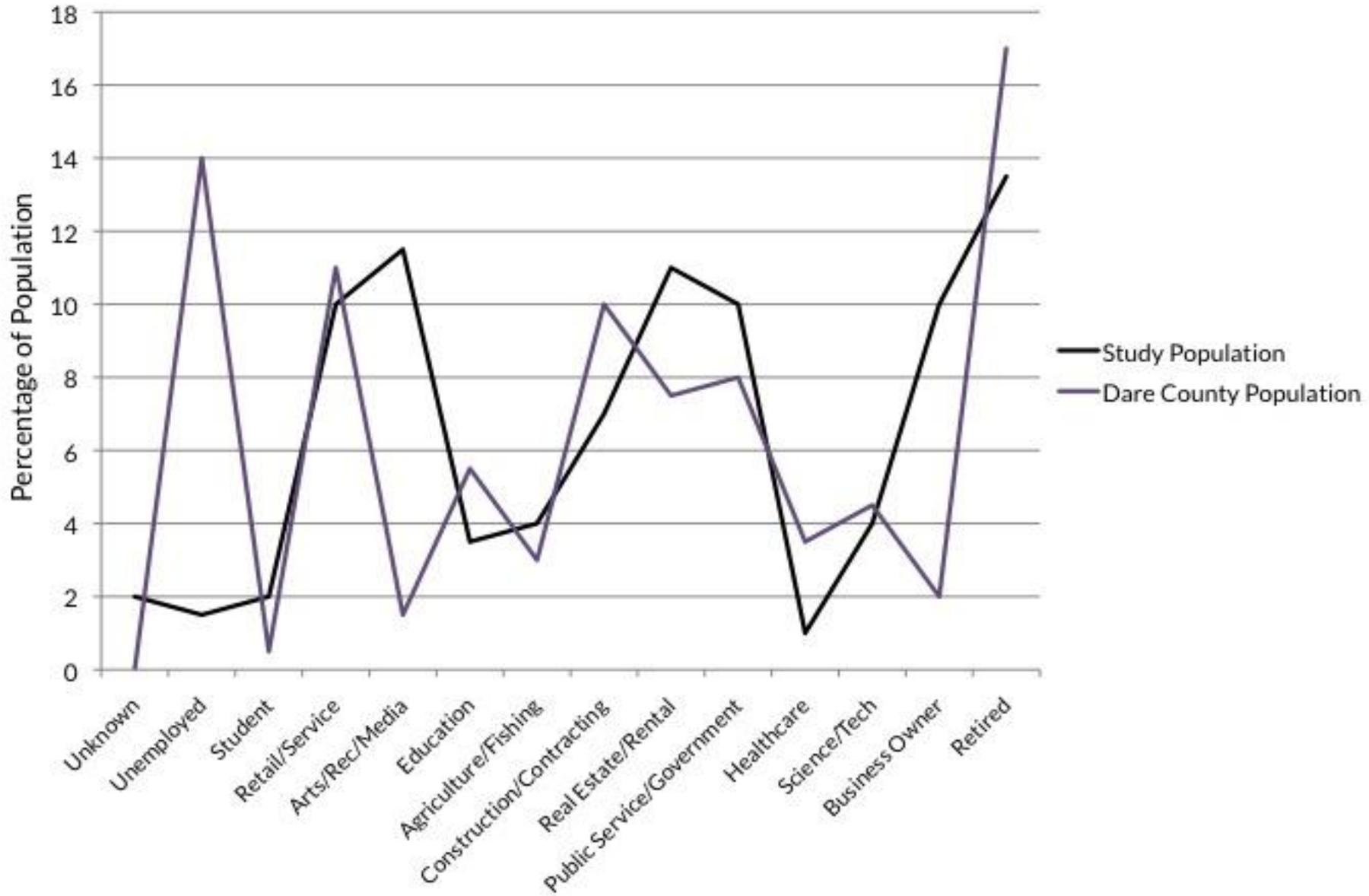
14% Between 50 and 75% of Lifetime

33% Between 25 and 50% of Lifetime

26% Less than 25% of Lifetime

Participant Demographics

Occupation Distribution by Industry



Demographics of participants in IBX counties: Tyrrell and Hyde

Gender distribution

53% women

47% men

Ethnic distribution

European American: 64%

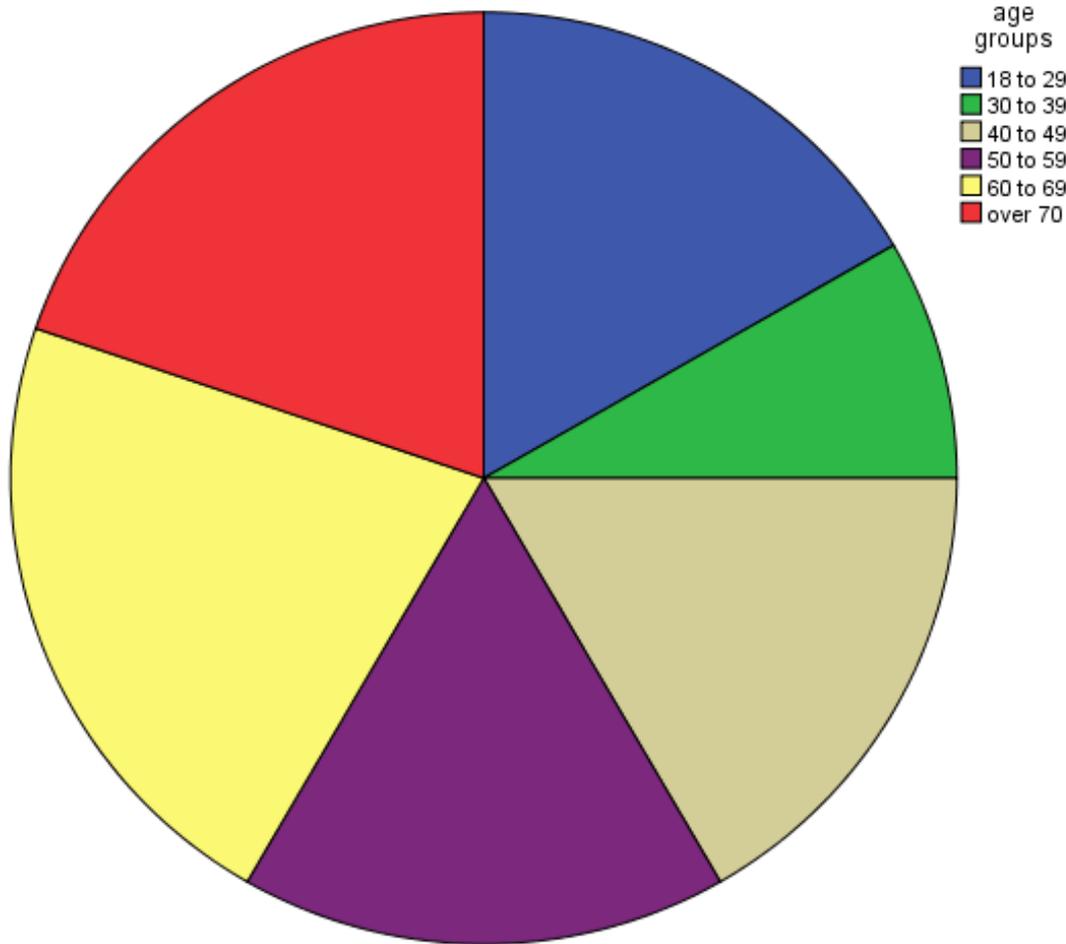
African American: 30%

Hispanic American: 4%

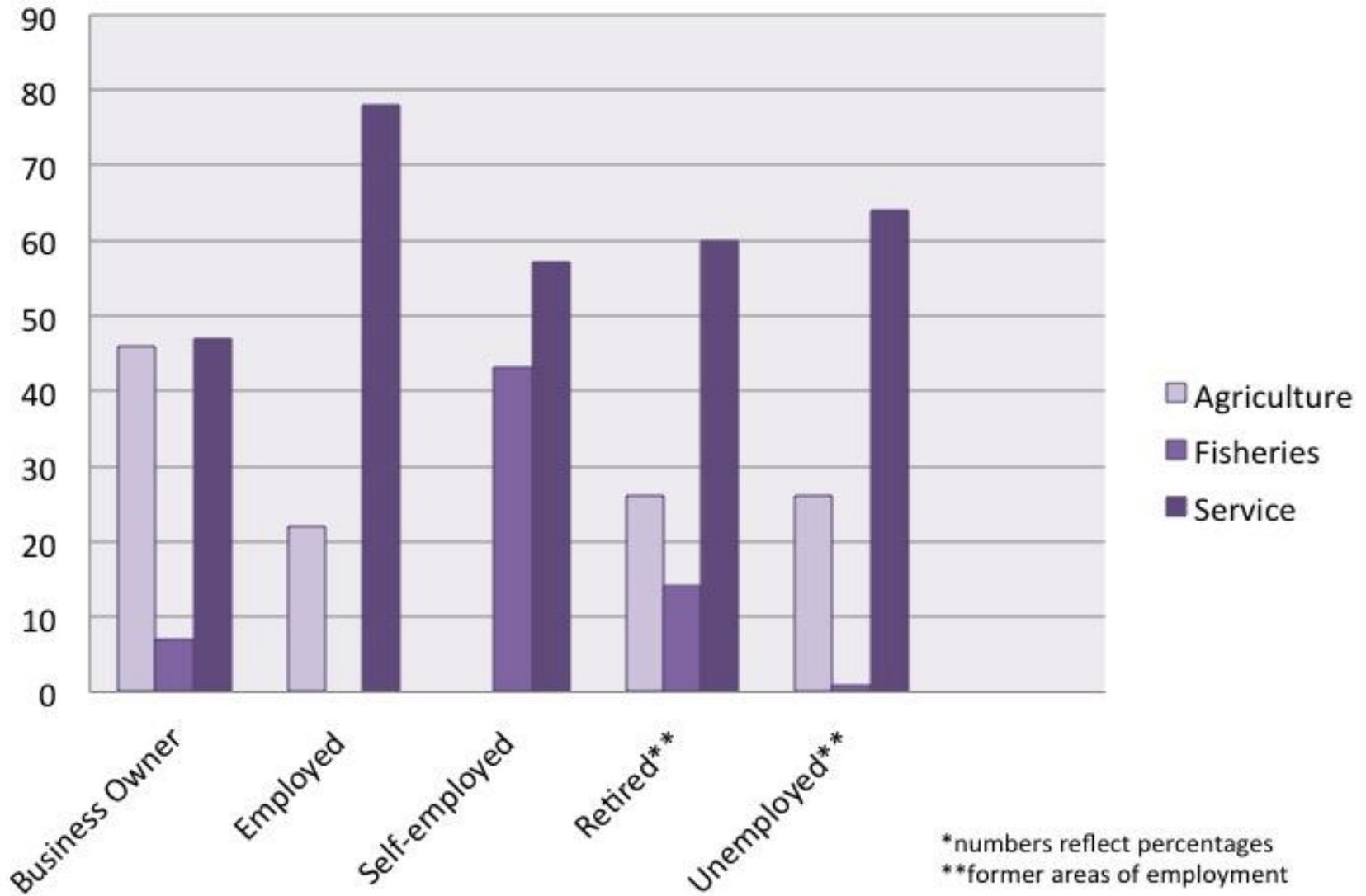
Asian American: 2%*

* only in Tyrrell County

Age distribution among Tyrrell and Hyde County participants



Occupation by Industry*



*numbers reflect percentages

**former areas of employment

General views on nature

Measure of agreement to selected statements:

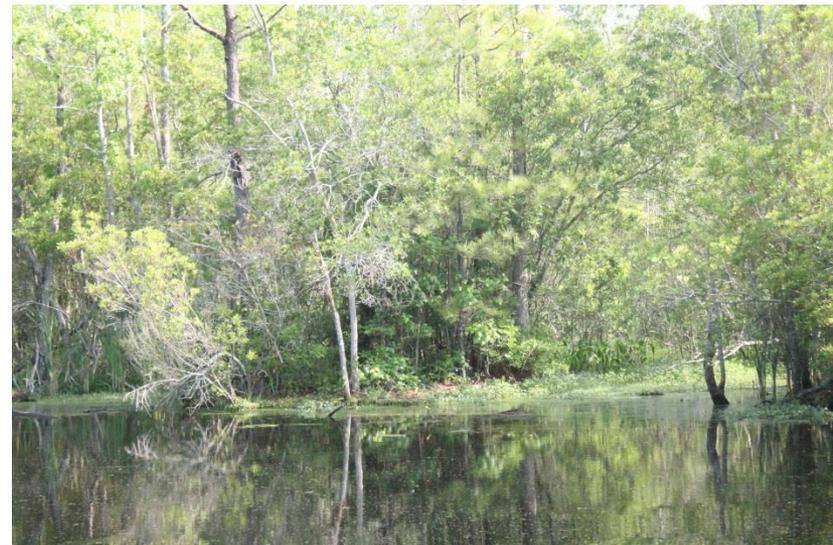
agree / disagree

in Dare, Tyrrell, Hyde



Bio-centric: put nature first

- To protect nature, some areas need to be closed to visitors.
- The longer a natural area is left untouched, the greater its value.
- Wind turbines and cell phone towers make nature less valuable.



Anthro-centric: put humans first

- Nature is less fragile than some people think.
- Not every single rare plant needs to be protected.
- Humans may use nature as they see fit.



Bio-centric: put nature first

- To protect nature, some areas need to be closed to visitors.
- The longer a natural area is left untouched, the greater its value.
- Wind turbines and cell phone towers make nature less valuable.

- 62% agree, 38% disagree.
- Women are more likely to agree than men.
- Tyrrell County residents under 40 years of age are less likely to agree than same age group among Dare County residents.

Anthro-centric: put humans first

- Nature is less fragile than some people think.
- Not every single rare plant needs to be protected.

74% agree, 26% disagree.

Men are more likely to agree than women.

- Humans may use nature as they see fit.

24% agree, 76% disagree.

Younger Tyrrell residents, under 40 years of age, are more likely to agree than older residents, over 60 years of age, with this this statement. That is surprisingly different from Dare County residents.

... reflection...

- Differences by county, age and gender
- Fewer differences by ethnicity

How do we know that we know something about opinions and attitudes?

Coding interview texts for:

- **Similarities and differences in content**
 - **Computing frequencies**
 - **Computing co-occurrences of codes (labels)**
- **Identifying exemplary *quotes***

'Sea-level rise' anyone?

Only 7% of participants in Dare County mention it explicitly.

Yet 25% of participants in Tyrrell County and 45% of participants in Hyde County mention it without being prompted.



The few “sea-level mentions” in Dare County

I know that there is sea level rise, but haven't seen it.

So I can't definitely say I've noticed sea level rise.



People who don't talk about sea-level rise

In Dare County talk instead about: **erosion**

- 80% of participants mention erosion

It's natural erosion. Water comes in and the island moves back. But with the houses and roads there is now nowhere for the beach to move. Water will eventually swallow up the houses.



“We fool ourselves into thinking that we have nice natural beaches but we have stopped the natural process and that’s why we need beach nourishment.”

75% of participants address beach nourishment when talking about erosion and mitigation strategies.



Comparing Voices

*“The Nags Head Beach Nourishment project was a **success**. We need to do projects like that because the beach is our biggest resource.”*

→ **Support nourishment without reservation**

*“I hate the expense of beach nourishment and it might just last 4 years or so. But it **has helped the economy**, helped us stay.”*

→ **Support with reservations**

*“The **beach is always going to be there**. It just might not be where it is today. Trying to preserve these beaches is like pissing in the wind. Eventually, it’s gonna do what it’s gonna do.”*

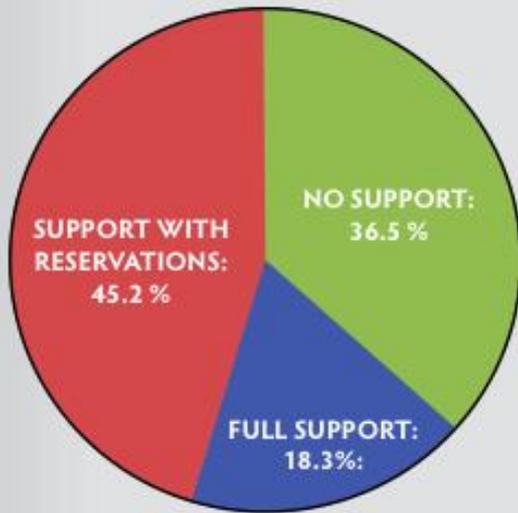
→ **No support of beach nourishment**

PLOT YOUR VIEWPOINT

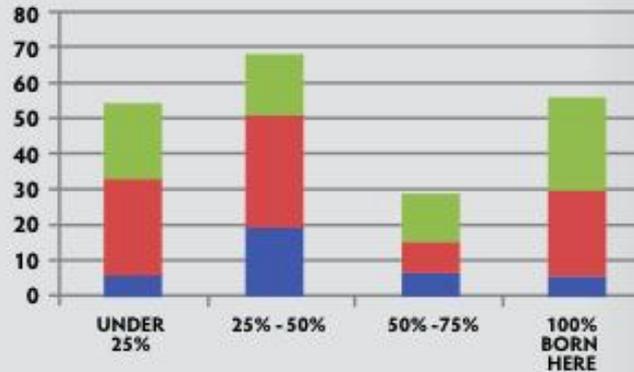
A chart-by-chart breakdown of beach nourishment perspectives

Source:
Outer Banks Milepost
3 (1) 2014,
Matt Walker and
Christine Avenarius

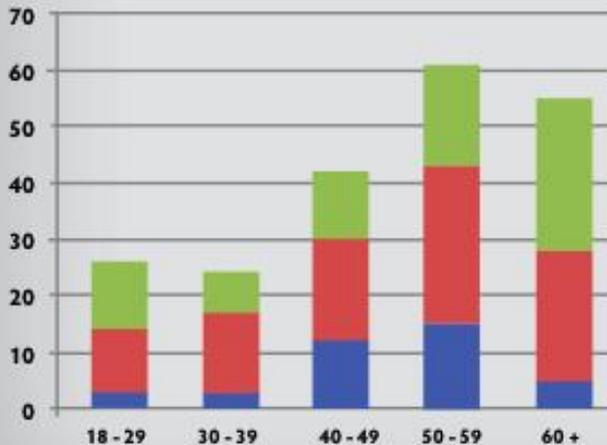
TOTAL RESPONSES



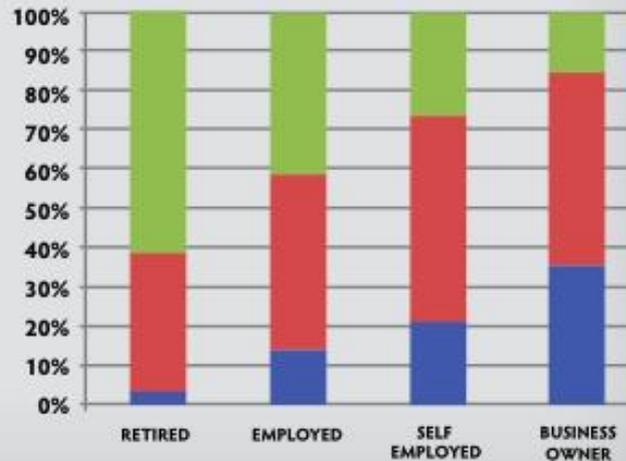
RESPONSES BY PERCENTAGE OF LIFETIME ON OUTER BANKS



■ NO SUPPORT
■ SUPPORT WITH RESERVATIONS
■ FULL SUPPORT



RESPONSES BY AGE



RESPONSES BY EMPLOYMENT STATUS

What about the group of citizens “with reservations”?

Economics matter: *Let nature take its course, but let me make money first...*

Less polarized opinions than hypothesized.



People who don't talk about sea-level rise

In Tyrrell and Hyde County talk instead about:
drainage problems, flooding, and erosion

- 90% of participants mention drainage

Drainage canals are not cleaned like they used to be and it floods more often.

- 20% of participants mention erosion

... but because of soil erosion the swamps are rising.

See all those stumps? The water is rising. We don't have a shoreline anymore because of erosion.

The “sea-level mentions” in Tyrrell and Hyde County

We are right at sea level.

We’re below sea level.

We are under sea level as it is.





... the dredging and outlets aren't being maintained and ever since the intercoastal opened up, the water level has been 11-14 inches higher than before...

When it comes to sea level rise and the idea of flooding, you are stupid if you don't agree it's a problem and let me tell you why...

Farmers can't deny sea-level rise because its taking their fields. It's saltwater intrusion.



Note: Hyde County residents are particularly aware of salt water intrusion

Salt water intrusion (IBX)

The salinity is surely much worse than it was about 30 years before.

Any time you get a higher tide level, it will make land not usable.

The water level has encroached on the trees and killed them.

Its not so much about drainage as it is about keeping the salt water out.

The biggest problem isn't flooding, its salt water getting in.

Who notices the salinity connection?

- 42% of European American informants in IBX
- 33% of African Americans informants in IBX



Note: knowledge about the process depicted in this photograph not widely shared

The Inner Banks challenge: wetland restoration

- What do locals know about it?
- Who supports it?

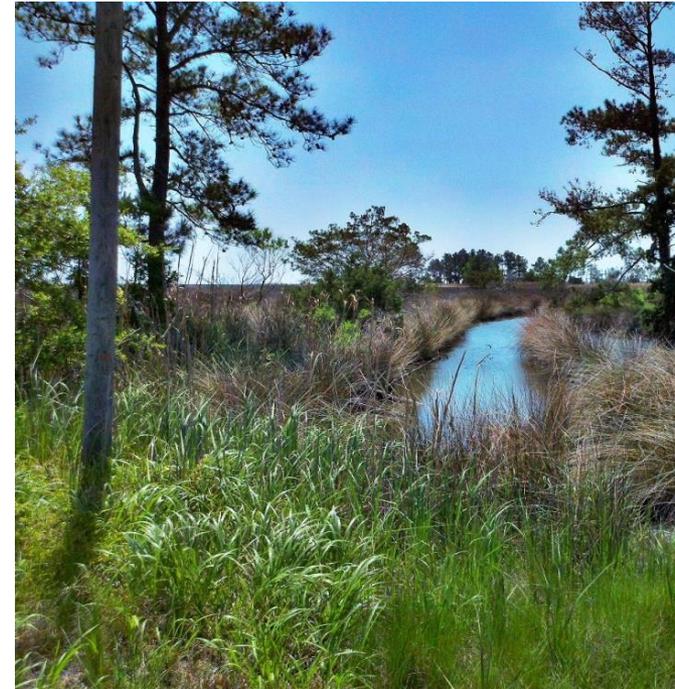


Perceptions about wetland restoration

If an individual owns land and wants to restore it, so be it... But we need to identify a wetland, what a wetland is. It's a swamp that cannot be farmed without a major pump system.

Wetland restoration is taking away the means to keep the rising sea level from taking away property.

Its because its hard to get the necessary permits to clear out the drains.



The wetland debate in IBX counties

Against wetland restoration

33% of all African American informants

53% of all European American informants

Supportive of wetland restoration

50% of all African Americans informants

35% of all European Americans (mostly U 40)

1/5 support it only if they were paid enough

→ Property matters

Drainage issues: specific to Tyrrell County



Everywhere needs to be drained out. Gum Neck has pumps. Columbia has always been sunk. There's no help for it.

I think a lot of people will have to move, or do something as far as drainage, but it's hard to block water. Dams work, but maybe not around here.



People want our neighborhood to become desolate. They release wildlife in our area and now people are afraid to go outdoors at night because of all the animals. Its like they want to push us out. We pay taxes, but look at our ditches. I guess they're waiting for everyone to die or leave.

Solutions?

If it's keeping water off, I wouldn't mind a higher tax. Look at the farming you can do in Gum Neck. It could happen elsewhere.

People don't mind if they see money put to use. I am open to a special tax for drainage maintenance, depending on the price.

I don't think that the tax for drainage maintenance is necessary. Government takes enough out already.

Who supports a drainage tax proposal in Tyrrell County?

- European American residents
 - 1/4 are against it
 - 3/4 are in favor
- African American residents
 - 1/3 are against it
 - 2/3 are in favor



Is a drainage tax a likely solution?

How high would the tax be? It doesn't matter though. I'd be willing to do that, but my cousins and neighbors are tight when it comes to spending extra money.

I am for it, but a lot of people are stuck in their ways. They wouldn't want to be forced to be part of a system and then be charged taxes for being part of that system. No way.

Economic visions

Participants in each county were tasked to sort potential tax revenue projects on their perceived feasibility.

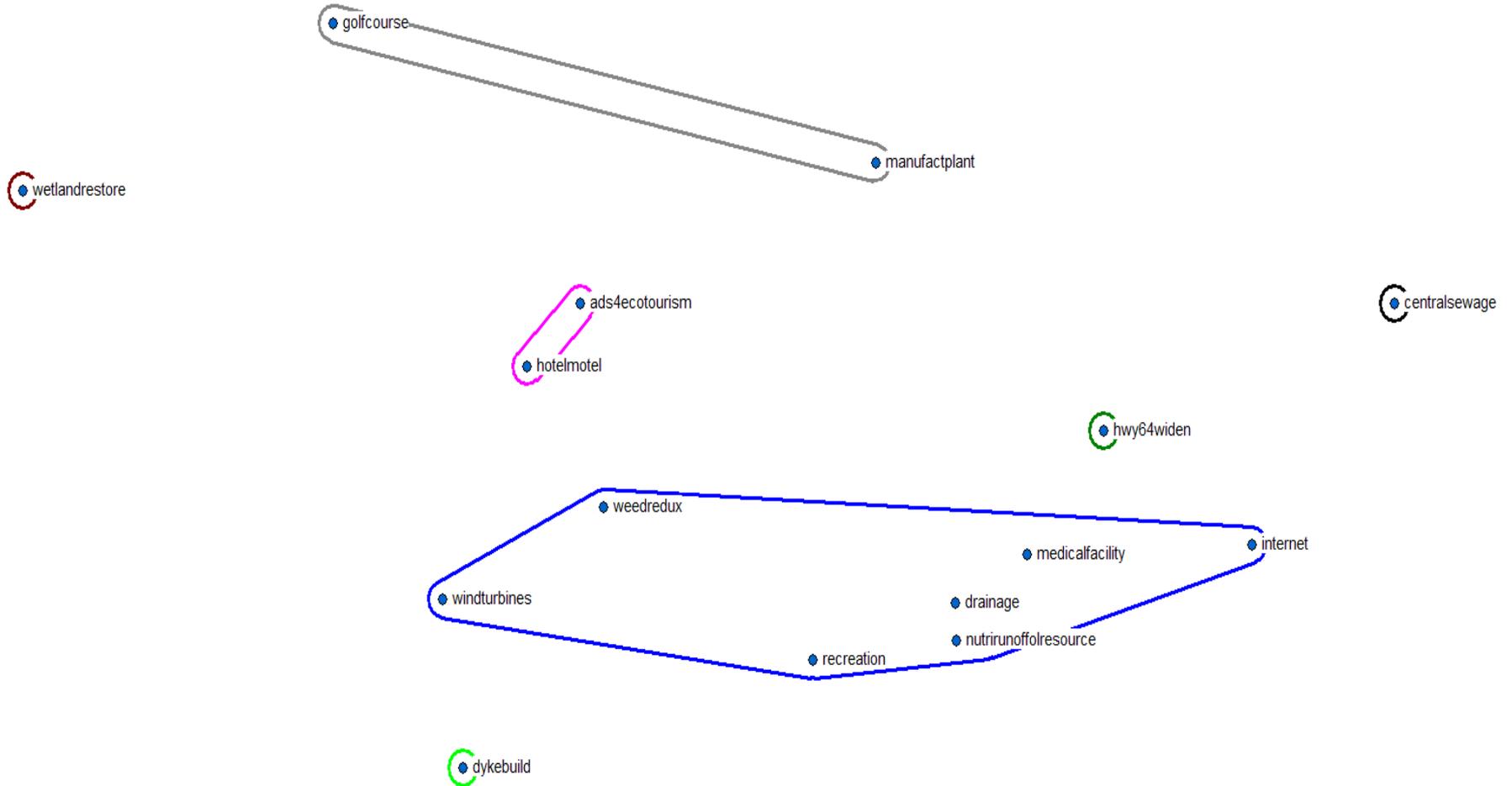


List of projects for evaluation

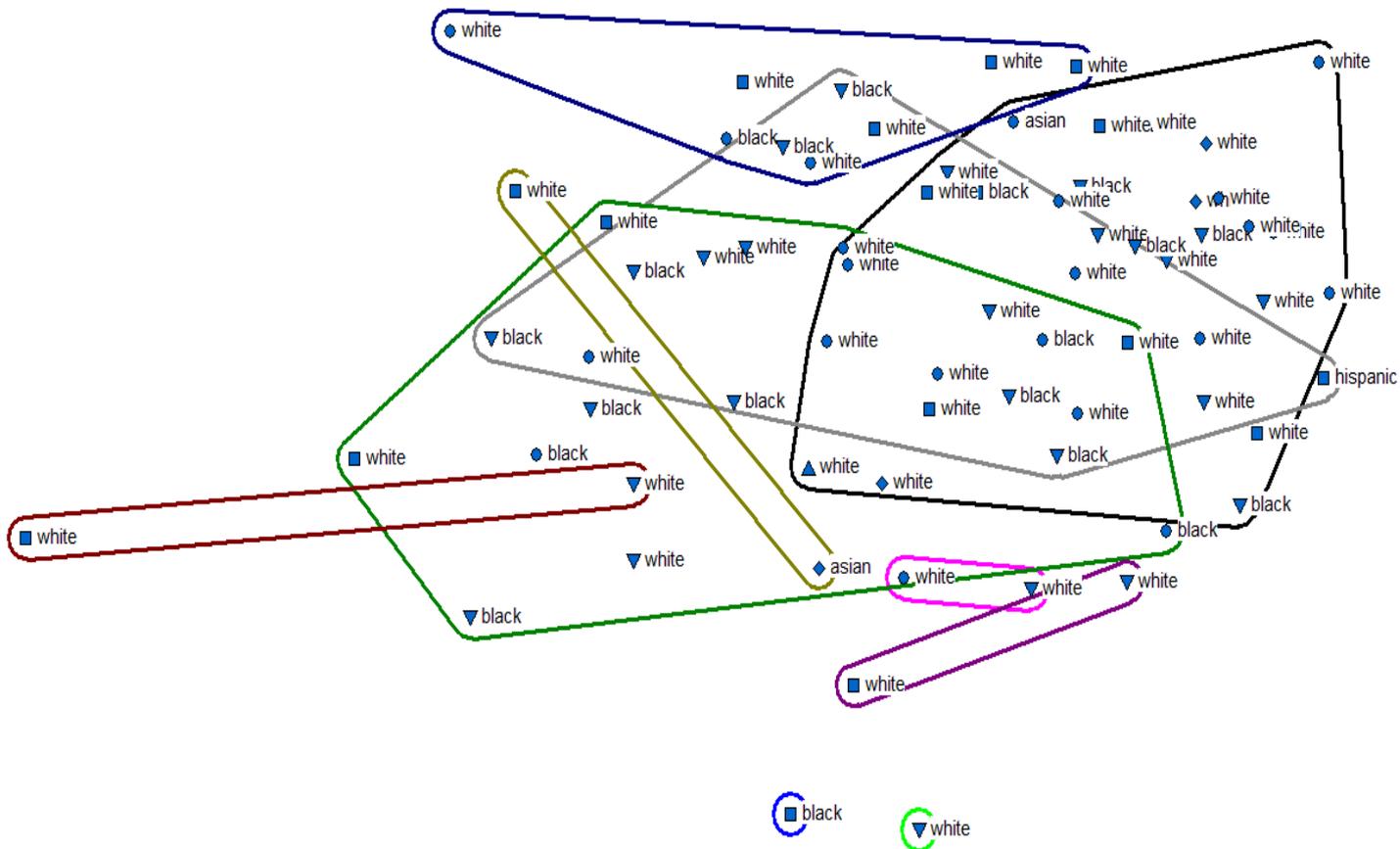
- Central Sewage system
- Solution to drainage issues
- More resources for teachers and school facilities
- Advertisement campaign for Eco-Tourism
- Golf Course
- Hotel or Motel
- Faster internet service
- Wind turbines
- Widening of Hwy 64 towards Mann's Harbor
- Dyke building
- Wetland Restoration
- Manufacturing plant to create jobs
- Medical facility/ home for elderly
- Recreational facility
- Alligator weed elimination
- Control of nutrient runoff



WHAT is sorted together in Tyrrell?

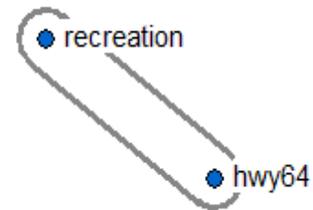
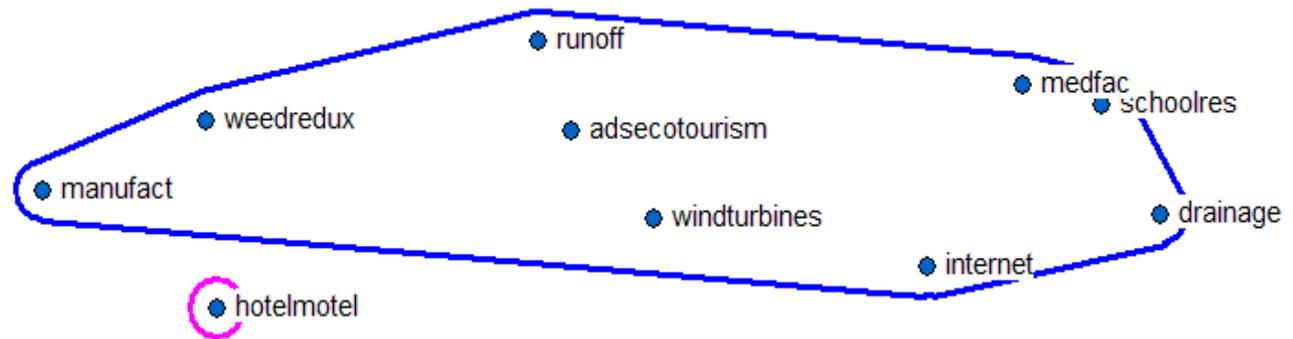


WHO sorts similar in Tyrrell?

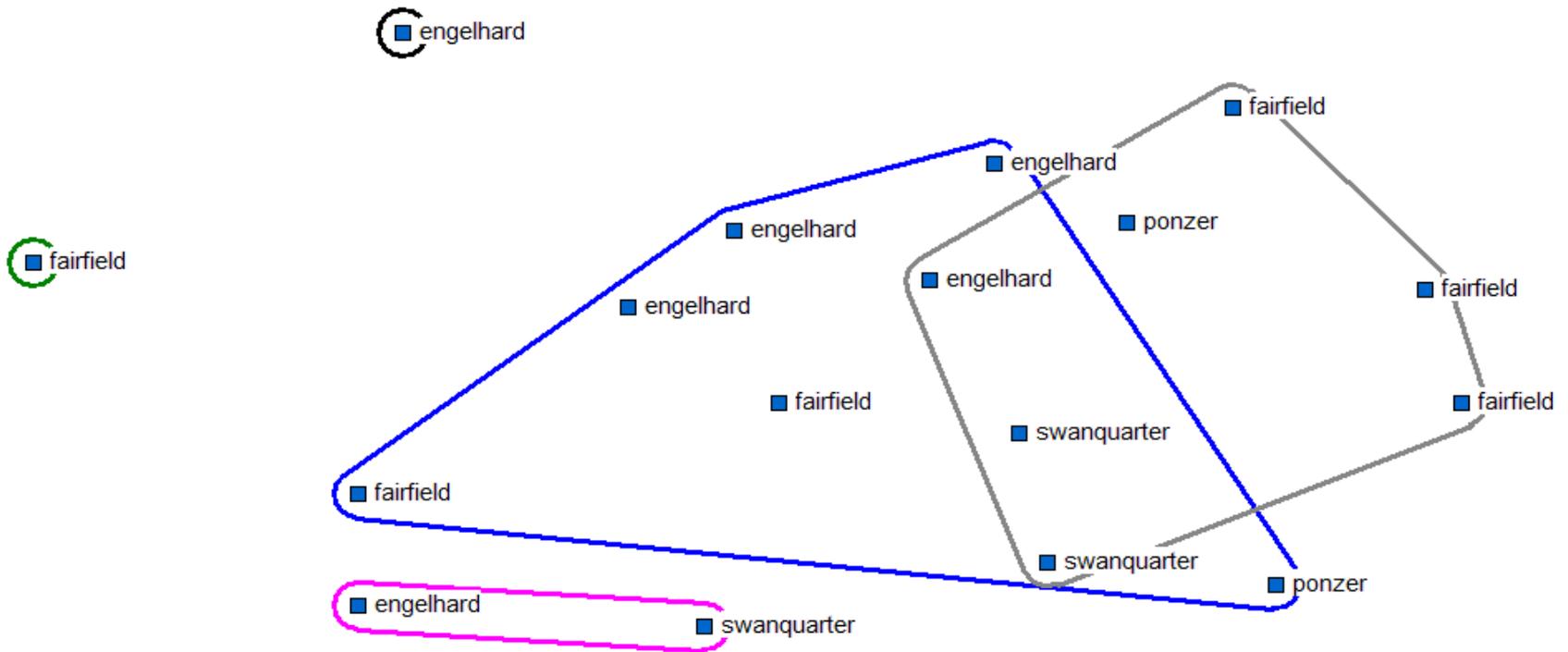


No clear pattern visible by ethnicity or gender or community location

WHAT is sorted together in Hyde?



WHO sorts similar in Hyde?



Note: similar to Tyrrell County individuals: no clear pattern visible

Hyde residents about the economy in their county:

The locals that have a decent source of income don't want much change.

Farmers versus fishermen is an uncomfortable story to tell, because we're all neighbors. It's a touchy subject for those in the community. Big farms are getting bigger and running out smaller farms. These days you are better off doing a land job than a water job.

Reflections on OBX and IBX findings

- Majority of ENC residents is **aware** of changes.
- Opinions **not as polarized** as anticipated in OBX.
- Opinions **more ethnically heterogeneous** than anticipated in IBX.
- **Uncertainty** about economic future is more “real” than uncertainties about sea level rise.
- Residents’ age, position in the lifecycle, and **economic constraints** make a difference in opinions.

Coping or Adapting?

- OBX vulnerability:
 - tourism industry drives decisions
 - IBX vulnerability:
 - lack of funds and people
 - drainage issues and wetland restoration are divisive
- Economic stability is key for any adaptation measure, especially among residents owning property (IBX and OBX)

Humans are part of nature too...



Opinions differ about how to interact with nature.

Concerns about costs.

→ **New land management activities needed**

→ **Building consensus, connectivity among county residents needed**

Where are opinions coming from?



Values, attitudes and beliefs matter.

Social relationships matter in the use of rhetoric and the spreading of content.

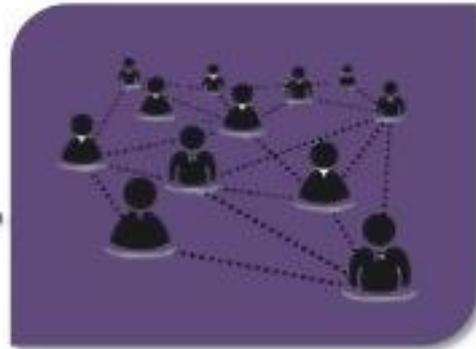
→ **Motivated reasoning**

How to build bridges between people who are immersed in **motivated reasoning** ?

Talking about observations regarding the changing natural environment is a first step towards **engagement** across groups of like-minded people.

Mutual understanding between different stakeholders about each other's viewpoints, values, and needs might be able to build bridges towards **joint participation in adaptation planning**.

Where do we go from here?



Need to understand how information flows, and how to reach others: a study of social network structures.

Merge the need to achieve economic stability with the need to preserve natural processes.

