

# Better resilient than resistant

## Regeneration dynamics of hurricane-disturbed mangroves on Guanaja (Honduras)

Thomas Fickert

Physical Geography, University of Passau (Germany)

location

hurricane Mitch

sampling desing

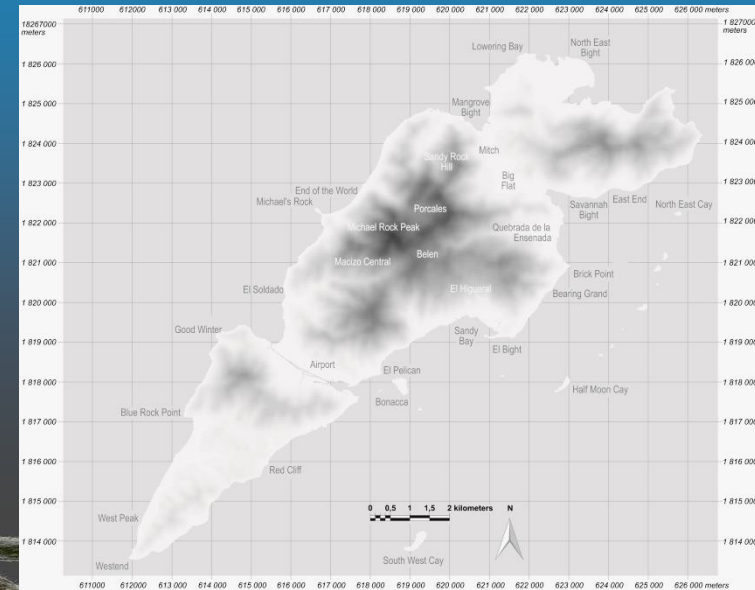
destruction & regeneration dynamics

successional trajectories



NASA worldwind

second largest of the Bay Islands  
pronounced topography



location

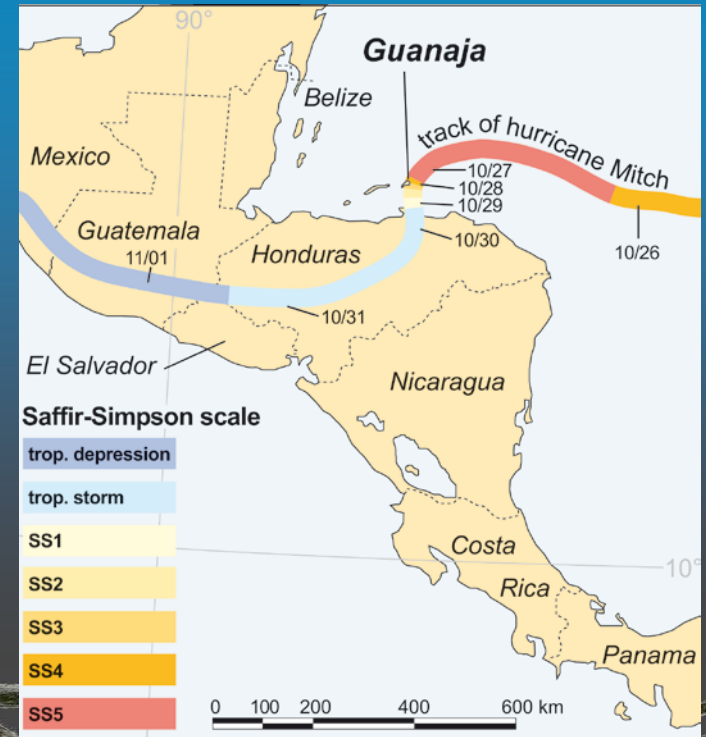
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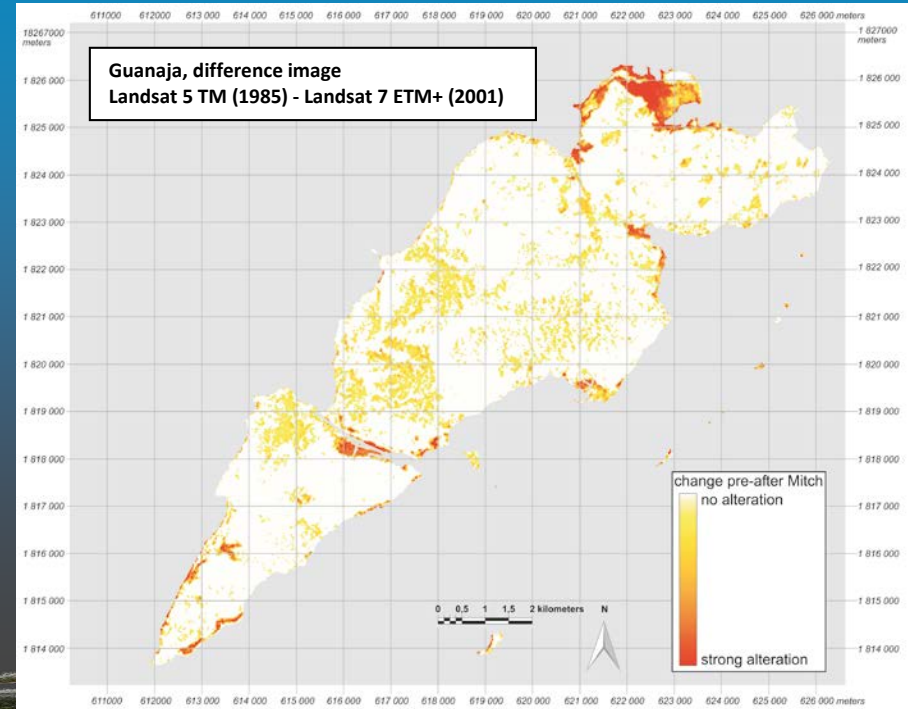
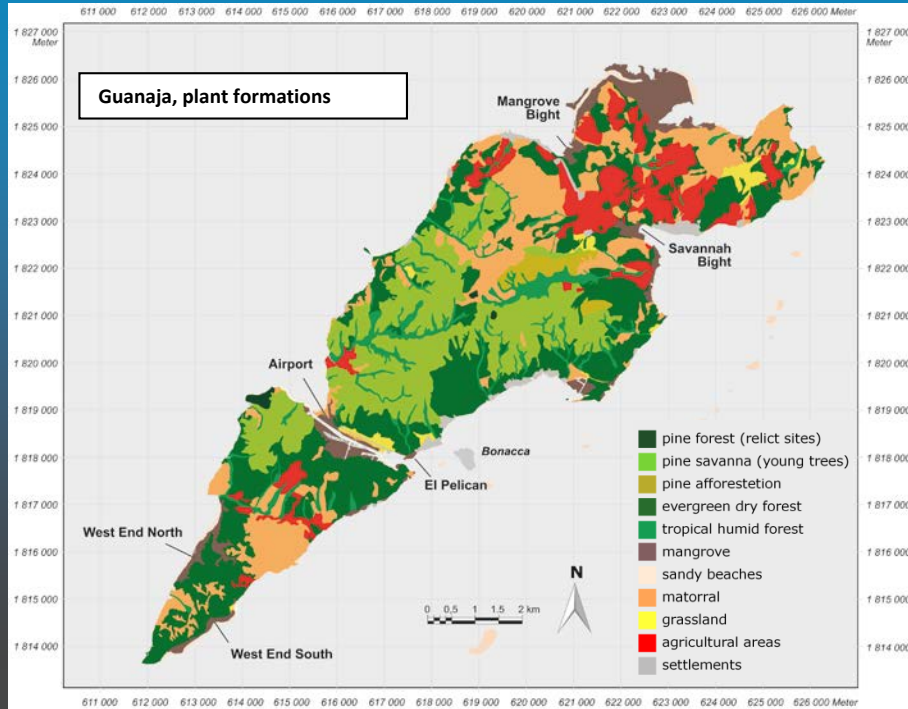
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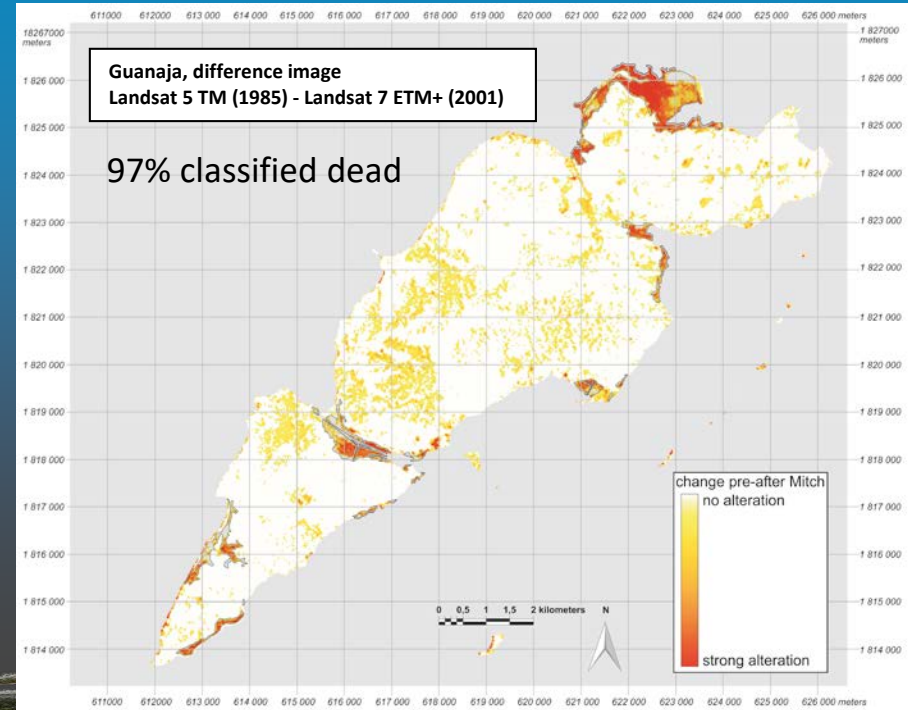
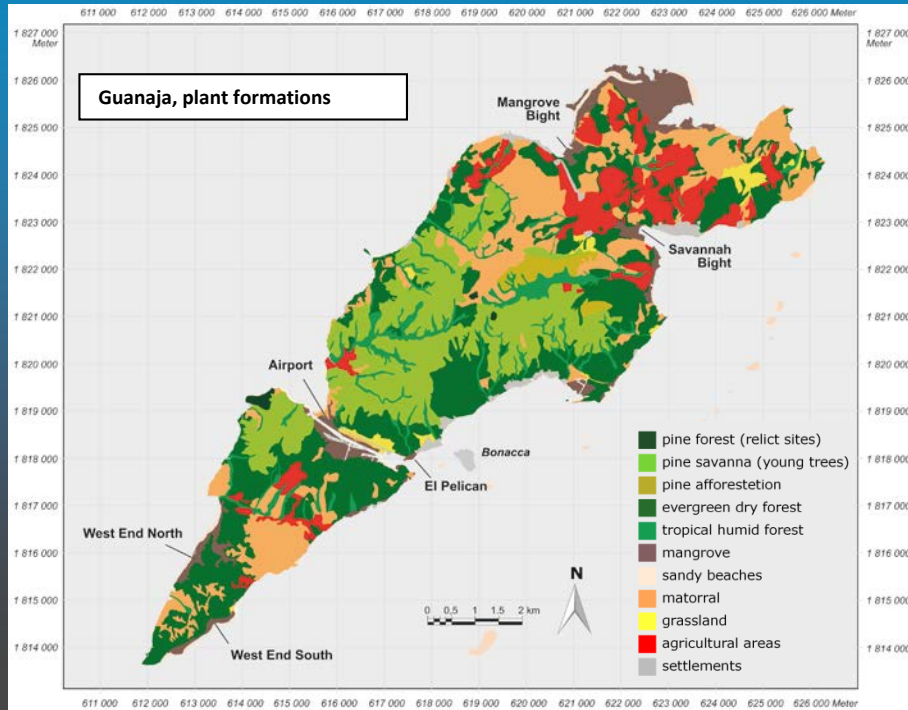
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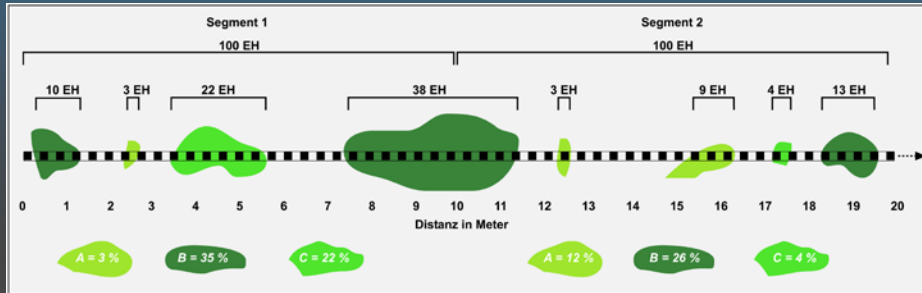
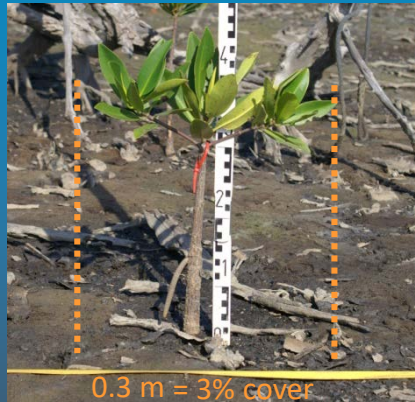
successional trajectories





6 mangrove areas studied 2005

- line-transects (> 1900 meters)
- resolution of 0.1 m
- conversion to % cover values for 10 m- segments
- two resurveys in 2009 & 2016



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hurricane Mitch

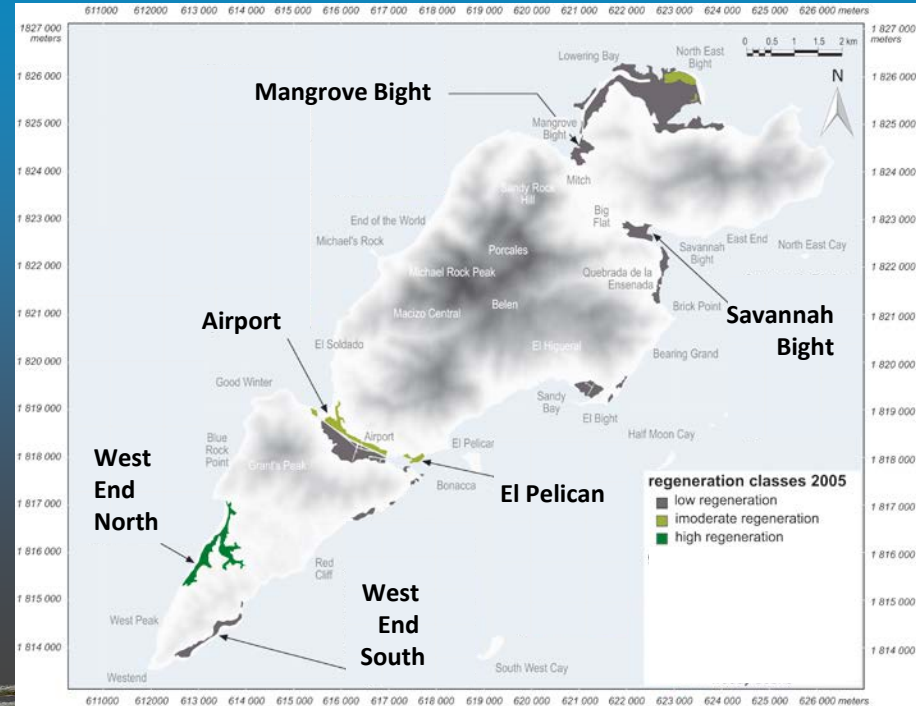
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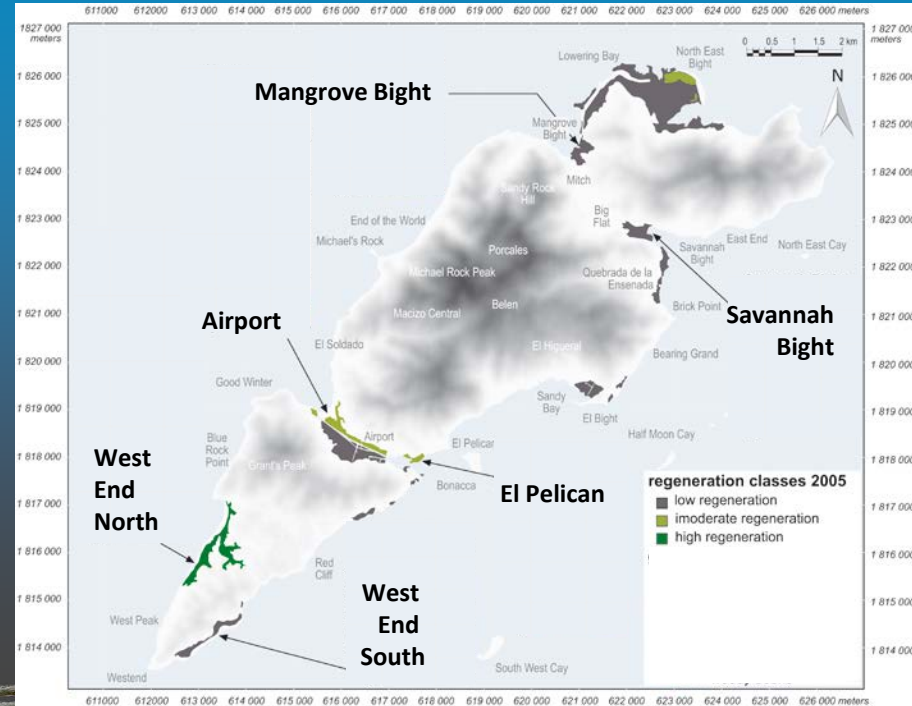
in 2005 destruction and early regeneration was different due to topography and exposure to hurricane winds:

- low, moderate or high regeneration classes:
- West End South, Mangrove Bight, Savannah Bight:
  - loss of leaf buds,
  - breakage of stilt roots
  - windthrow



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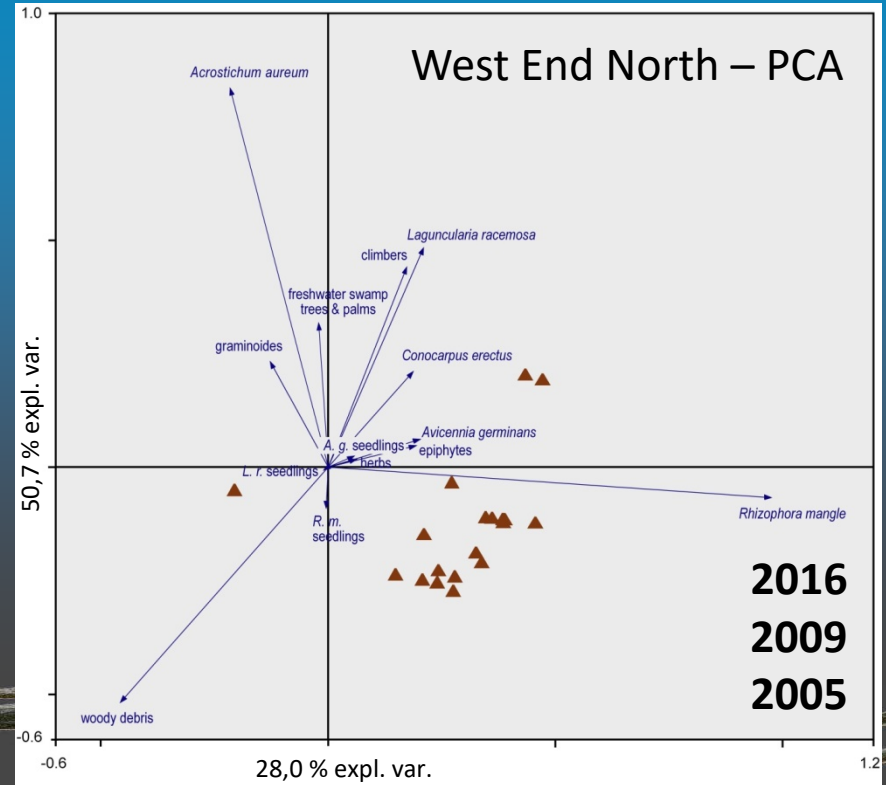
- low, moderate or high regeneration classes:
- West End North, Airport, Pelican:
  - low breakage of stilt-roots
  - mainly defoliation
  - resprouting





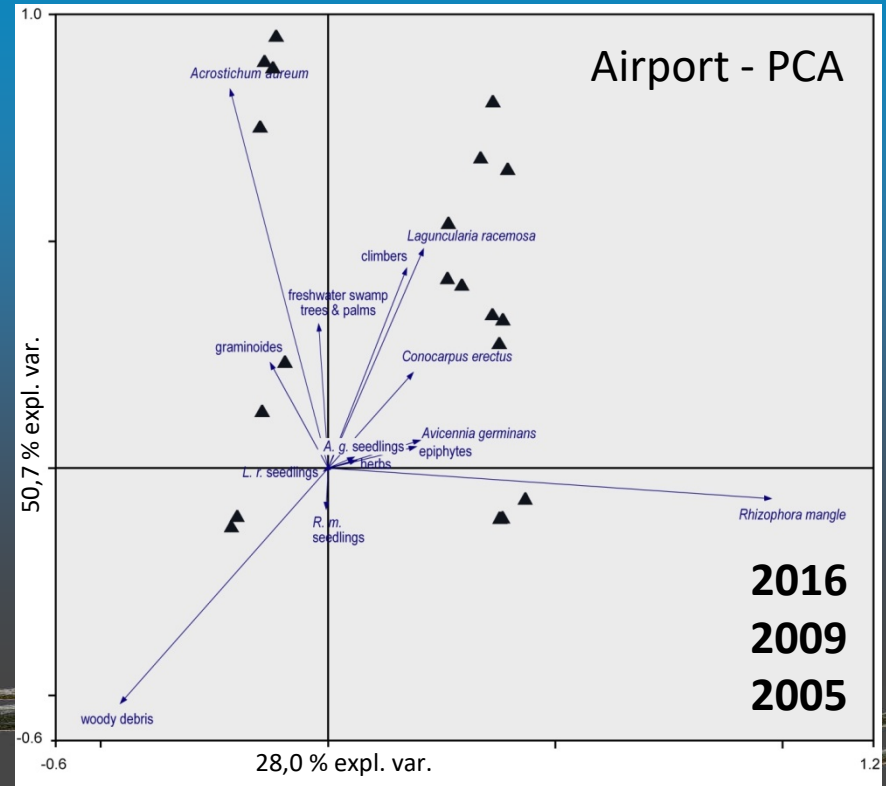
those differences in disturbance intensity and regeneration also become apparent in an PCA analysis, with *Rhizophora mangle* and *Laguncularia racemosa*, *Acrostichum aureum* and woody debris the most important factors to define the ordination space

- West End North: little change, vital forests in 2005



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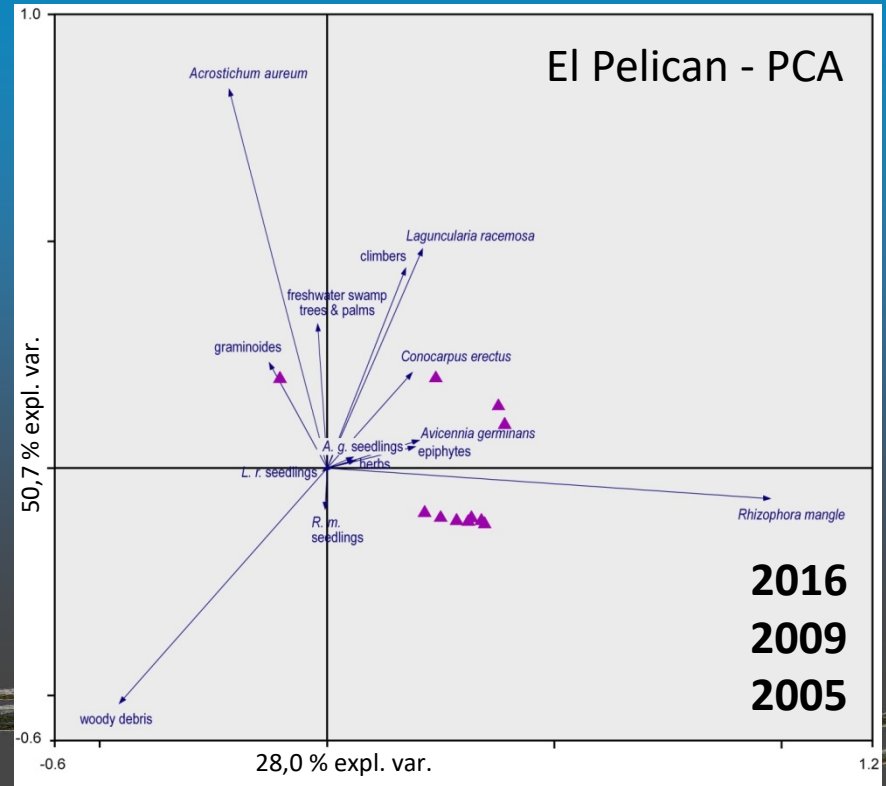
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- Airport: little change, some segments vital, some still not





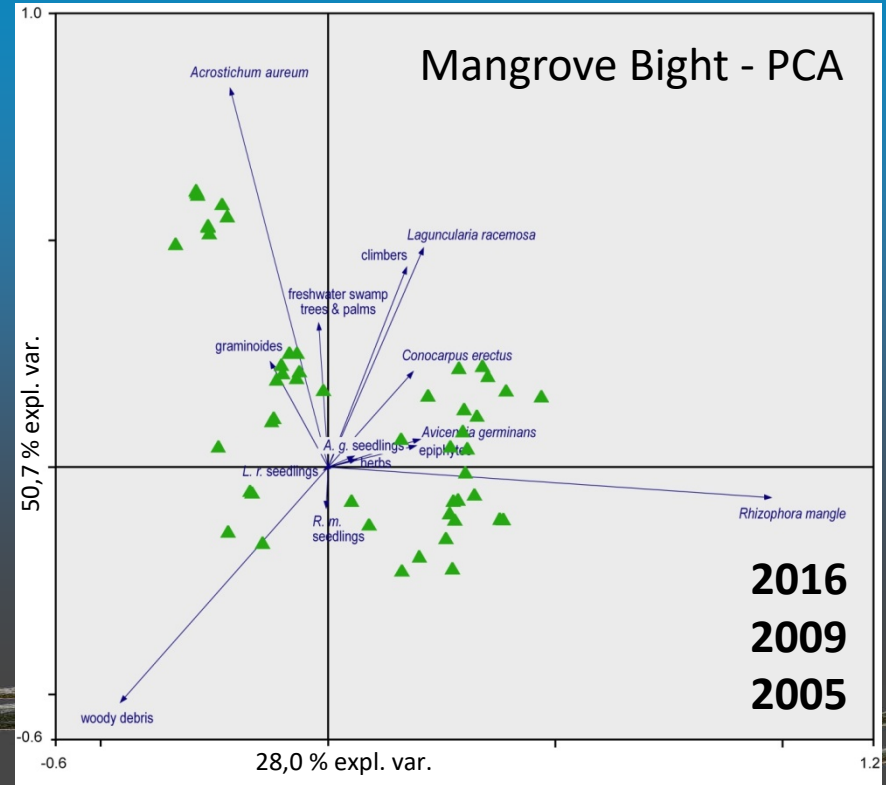
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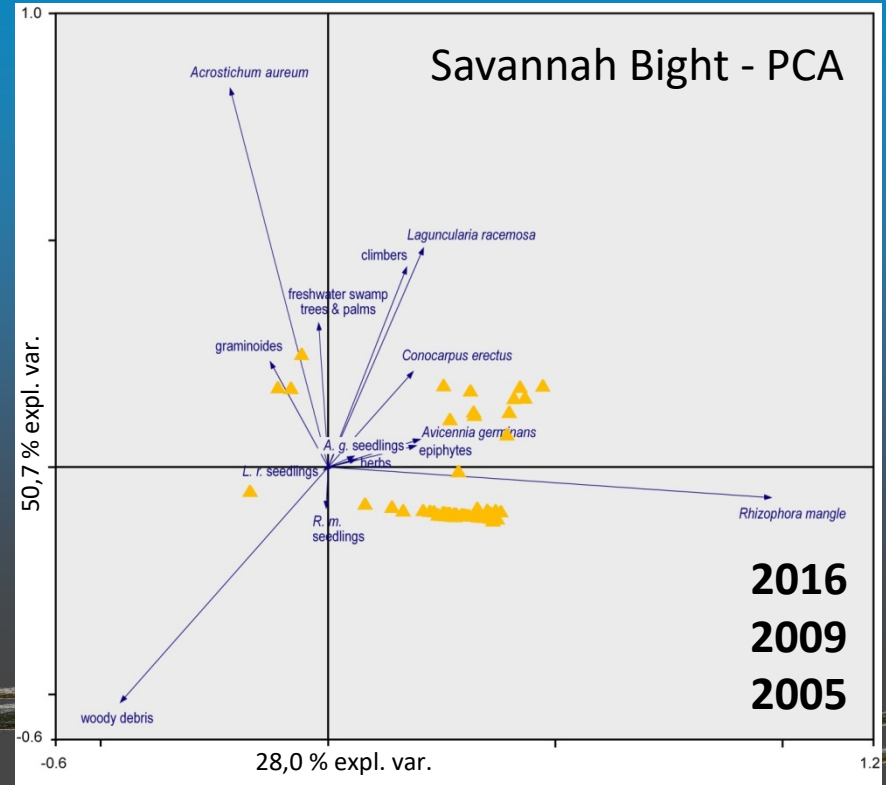
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- Mangrove Bight: obvious change between 2005 & 2016





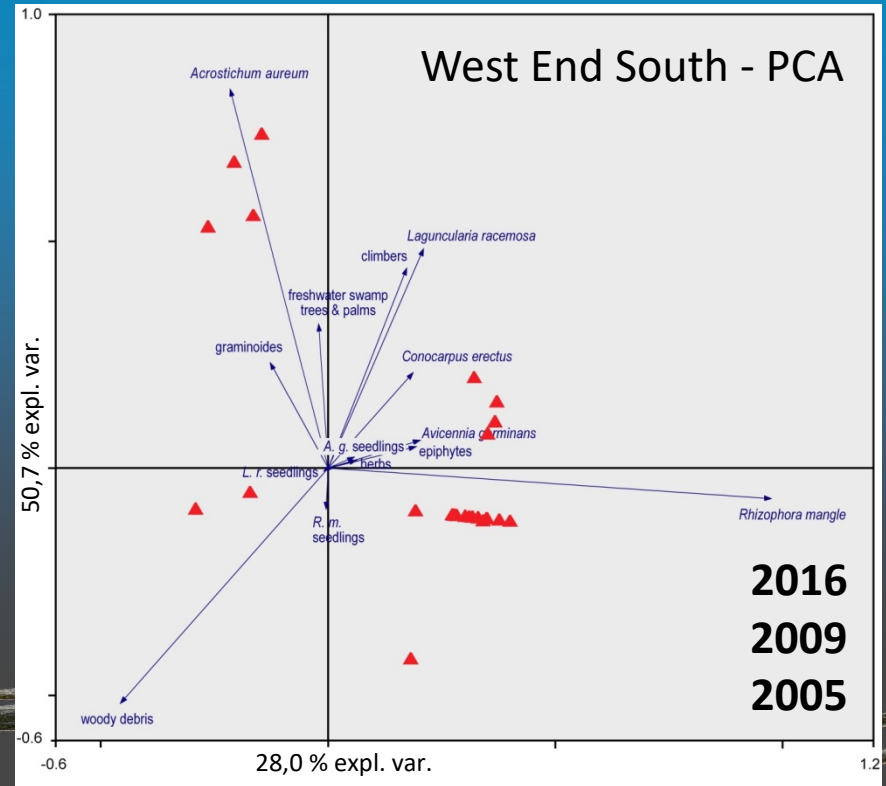
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- Savannah Bight: obvious change between 2005 & 2016



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- Mangrove Bight: obvious change between 2005 & 2016
- Savannah Bight: obvious change between 2005 & 2016
- West End South: obvious change between 2005 & 2016





## West End South

2009



2016



location

hurricane Mitch

sampling design

**destruction & regeneration dynamics**

successional trajectories



## Savannah Bight

2009



2016



location

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## Mangrove Bight

2009



2016



location

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sampling design

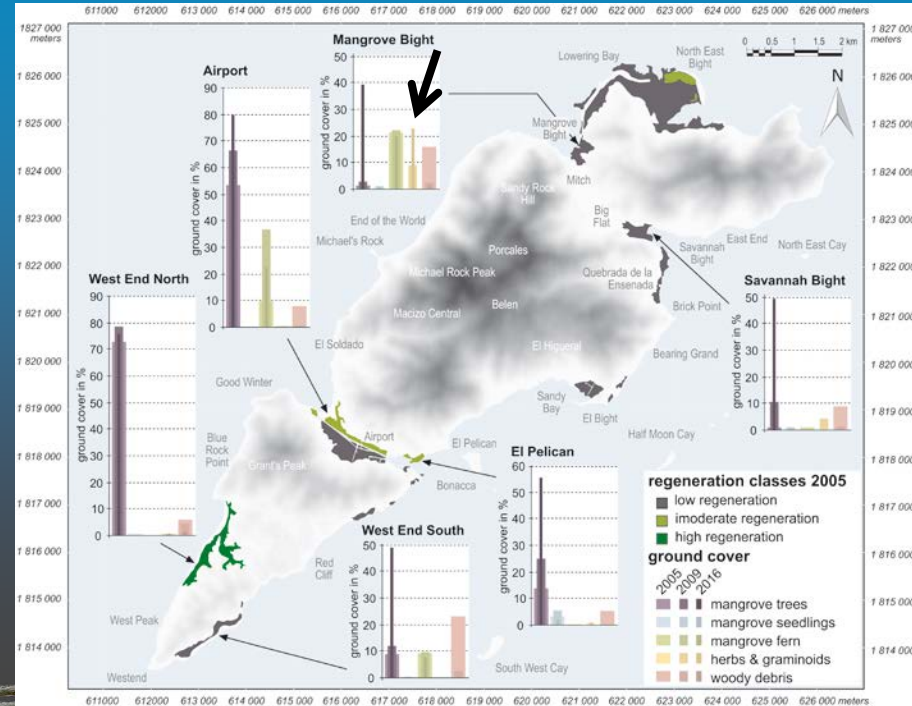
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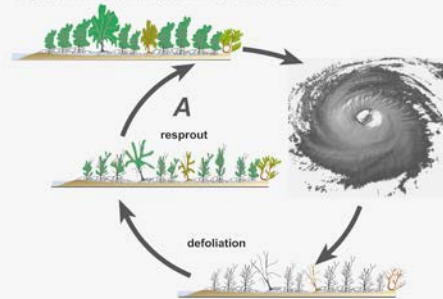
regeneration variable but progressive

- West End North similar to pre-Mitch already in 2005
- increase of mangrove tree cover even in the most impacted areas indicate ongoing natural regeneration
- regeneration not always as auto-successional pathway as indicated by herbaceous stage in Mangrove Bight



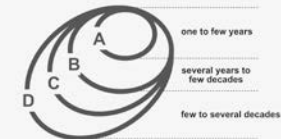
different regeneration pathways

old growth *Rhizophora mangle* dominated mangrove forest

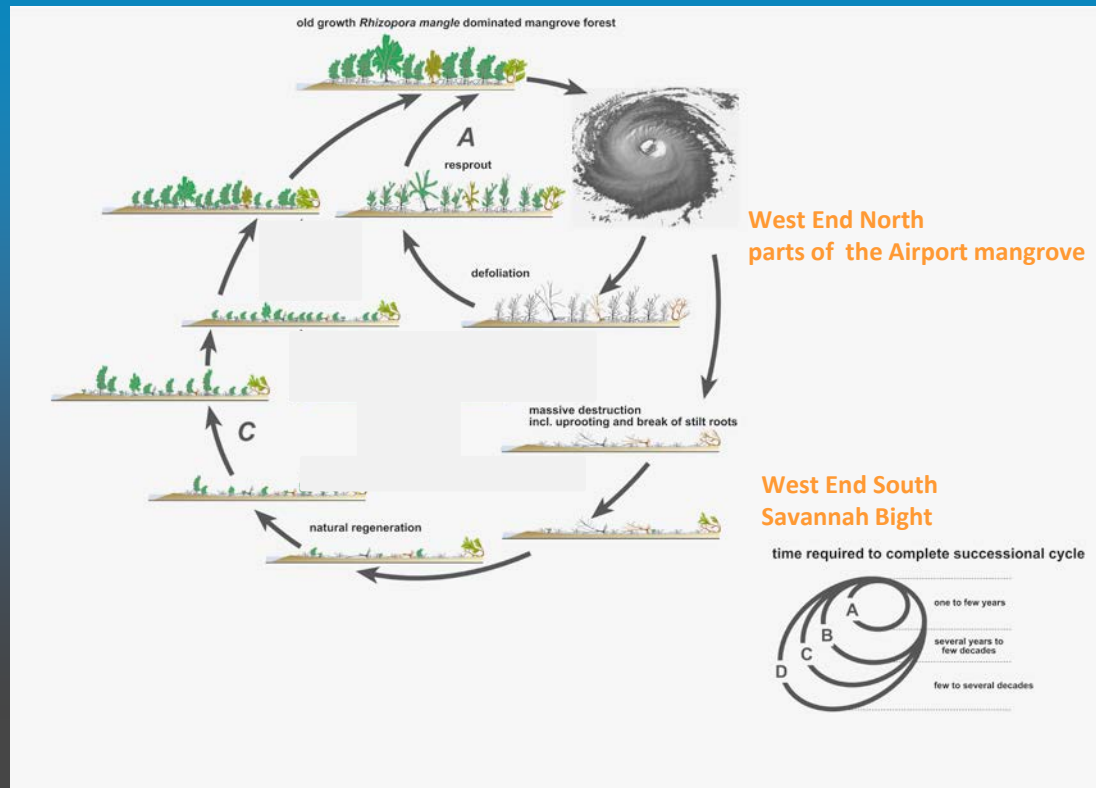


West End North parts of the Airport mangrove

time required to complete successional cycle



different regeneration pathways



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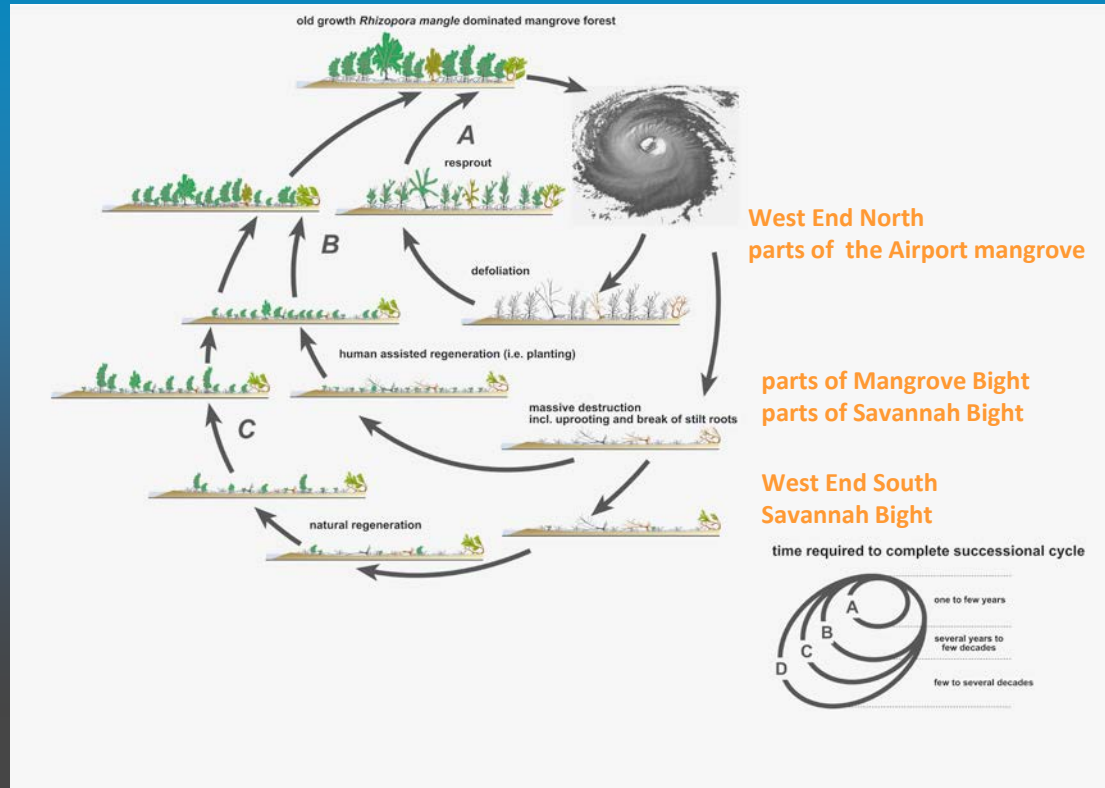
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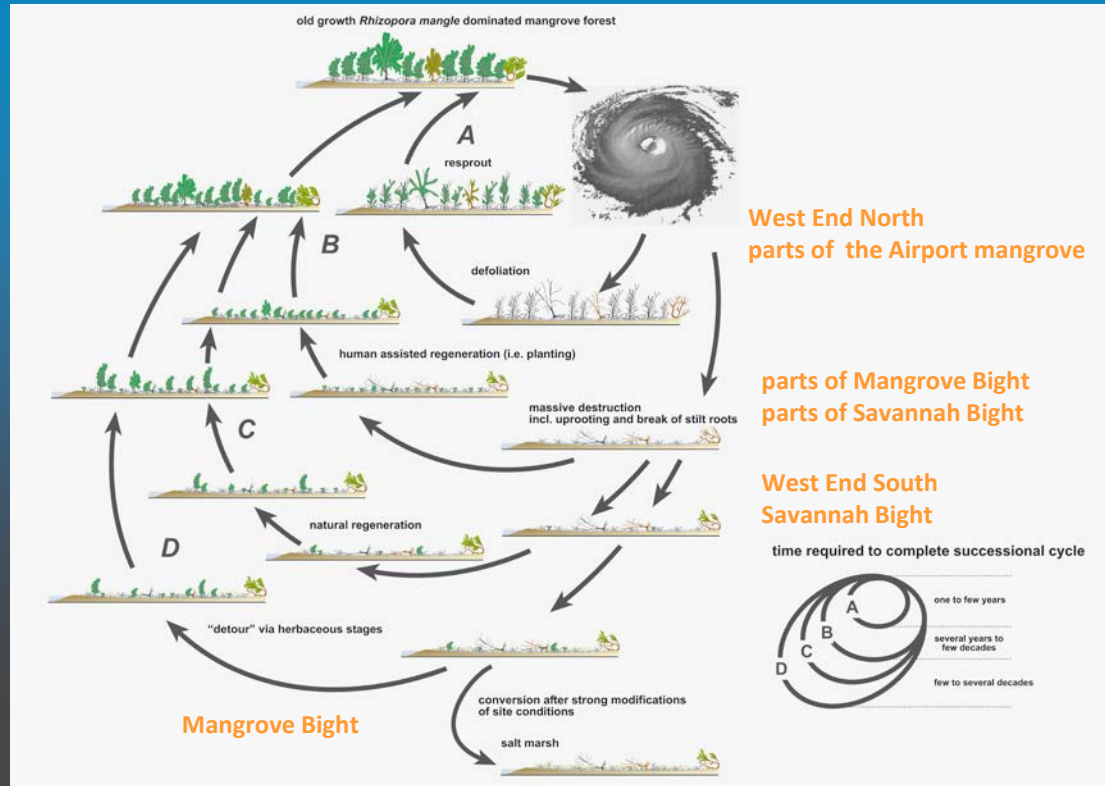
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different regeneration pathways

→ mangroves on Guanaja are regenerating, some slower, some faster

→ mangroves are not very resistant but very resilient ecosystems





# thank you for your attention ...

... and the following people and institutions for support

- DFG (FI 1254/2-1 & FI 1254/4-1)
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