



YourTern-Project

Windhoek – 17-07-2024

Who are we?

- **Ruben Fijn**

Senior Research Ecologist
Waardenburg Ecology

- **Jolanda Veldhuis**

Associate Professor in
Social Marketing / Media Psychology
Vrije Universiteit Amsterdam

- **Bas Engels**

Senior Research Ecologist
www.meetthefossyls.com

TEAM HOLLAND



Who are we?

- **Jean-Paul Roux**
 - Luderitz
 - Former MFMR
 - Expert on Benguela Ecology
- **Mark Boorman**
 - Swakopmund/Walvis Bay
 - Tern ringer
- **Holger Kolberg**
 - Conservation scientist
 - Former MEFT
- **Hartmut Kolb**
 - Swakopmund/Walvis Bay
 - Tern ringer

TEAM NAMIBIA



The YourTern-Project

From science to nature conservation



MINISTRY OF ENVIRONMENT
AND TOURISM



VRIJE
UNIVERSITEIT
AMSTERDAM



The YourTern-Project

From science to nature conservation

- The Your Tern Project aims to fill specific knowledge gaps that exist around Damara Terns to adequately inform the Namibian “Damara Tern Species Action Plan”.



Why the Damara Tern?

- Unique for Benguela system
- Up to 98% breeds in Namibia
- Threats
- Declining population

- Specific knowledge gaps
 - Breeding and migratory behaviour
 - Flagship species

The YourTern-Project

From science to nature conservation

- The Your Tern Project aims to fill specific knowledge gaps that exist around Damara Terns to adequately inform the Namibian “Damara Tern Species Action Plan”.
- The Your Tern Project also aims to develop an outreach program targeted at school children to improve nature awareness and stimulate nature conservation from an early age onwards



Why education?

- Develop and test outreach program
- Existing and new research outcomes
- Unique ecosystem >> ecotourism
- Foster pro-environmental behavior
- Empower local community



Ecological part



Damara Tern - *Sternula balaenarum*

~23 cm, 50-55 gram.





ANGOLA

CAPRIVI G.P.

ETOSHA NATIONAL GAME PARK

HUAB LODGE

NAMUTONI

RUNDU

OKAUKUEJO HALALI

TSUMEB

GROOTFONTEIN

OKAVANGO DELTA

SKELETON COAST

OTJIWARONGO

HENTIESRAAI

WINDHOEK

MAMONO

SWAKOPMUND

WALVIS BAY

REHOBOTH

NAMIB

NAUKLUF

PARK

HUKUNTSI

SESRIEM

MALTSPRUIT

MARIENTAL

KALAHARI

GEMSBOK

NATIONAL

PARK

NAMIBIA

HELMUTHINGHAUSEN

KEETMANSHOOP

TWEE RIVIEREN

LÜDBRITZ

ANNO GOSSER

FISH RIVER

CANYON

KARASBURG

UPINGTON

ALEXANDER BAY

ORANGE RIVER

LOUERABITES FALS N.P.

KAKAMAS

KEIMONS

PORT NOLLOTH

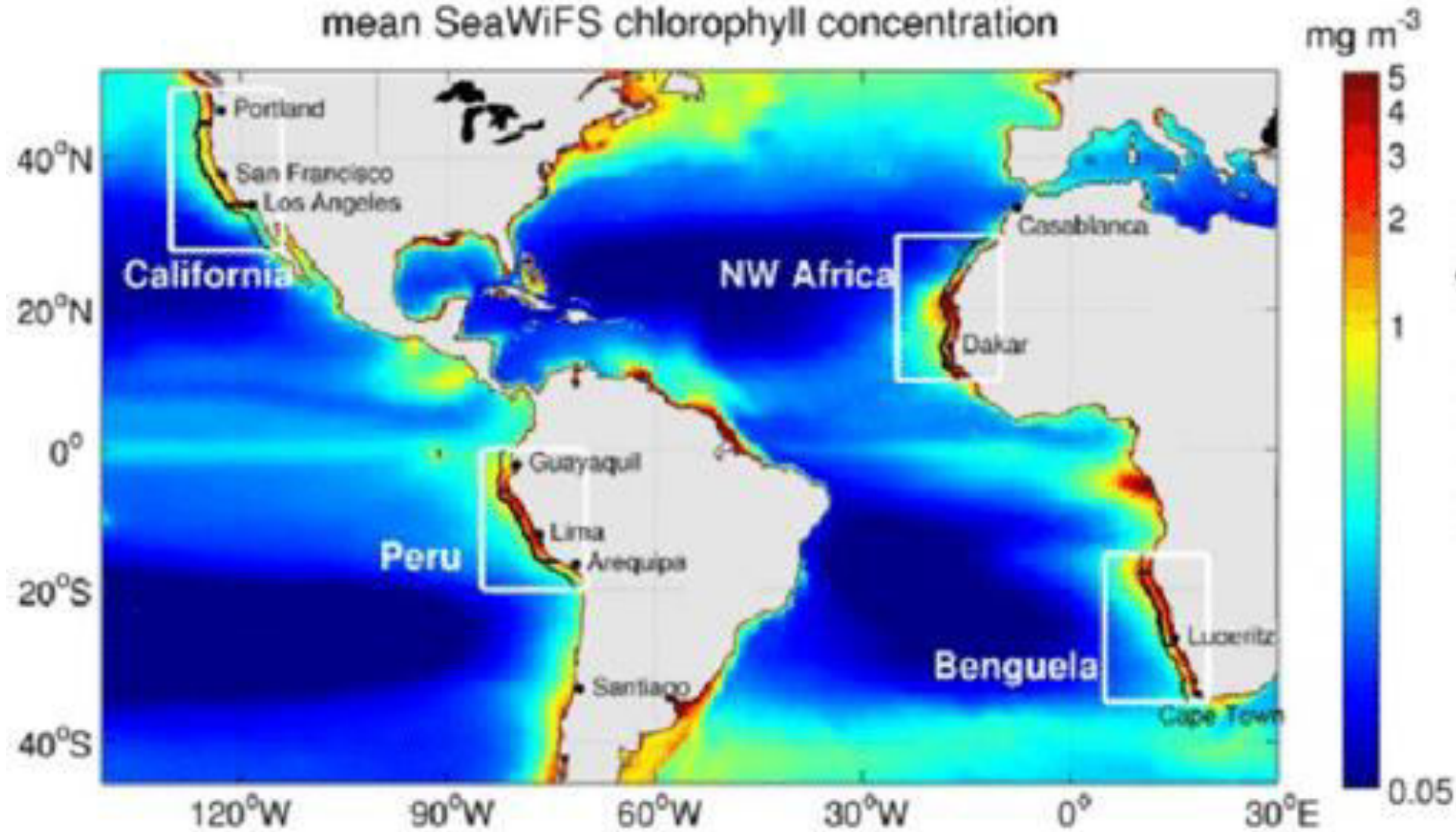
SPRINGBOK

POFADDER

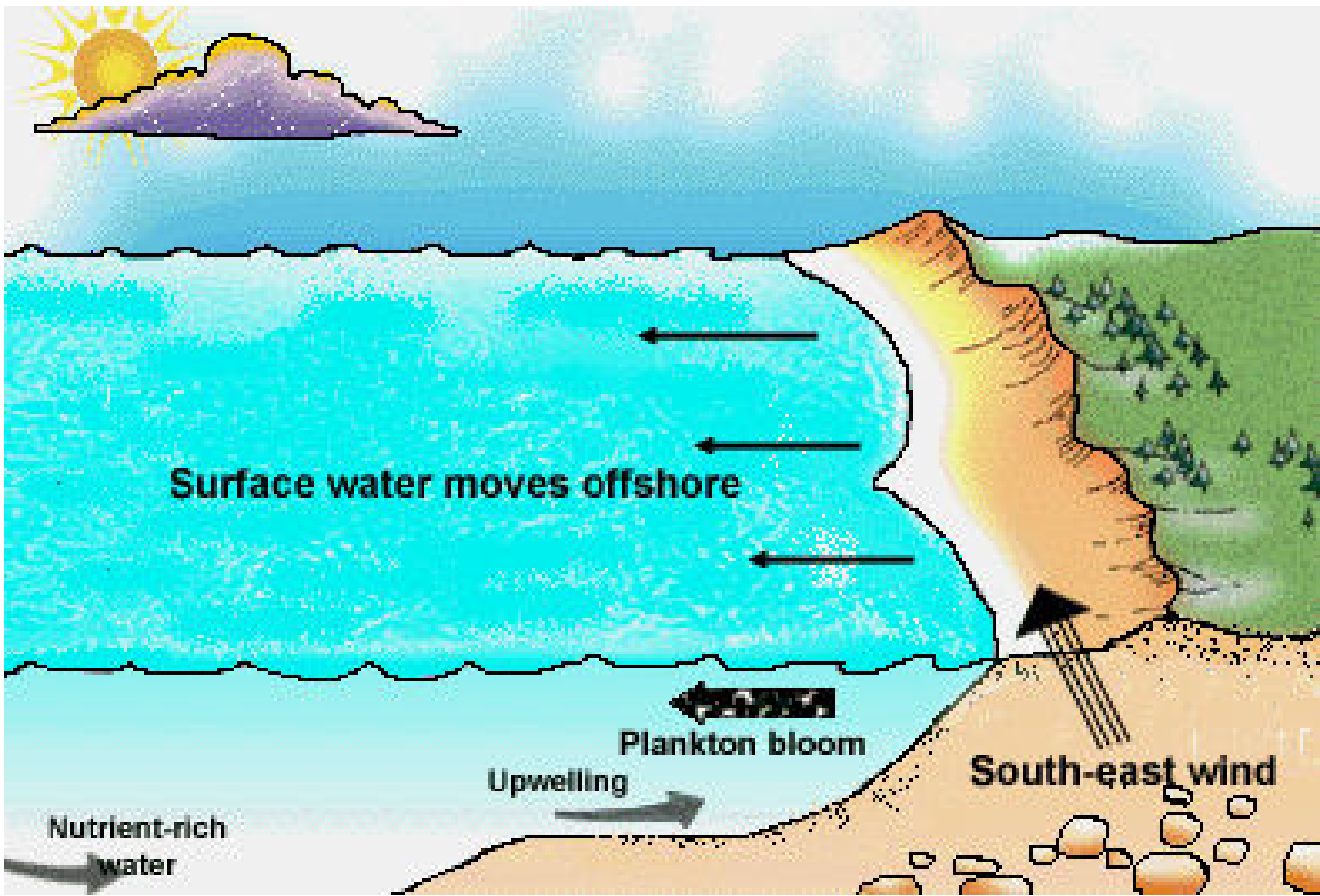
KLEINSEE

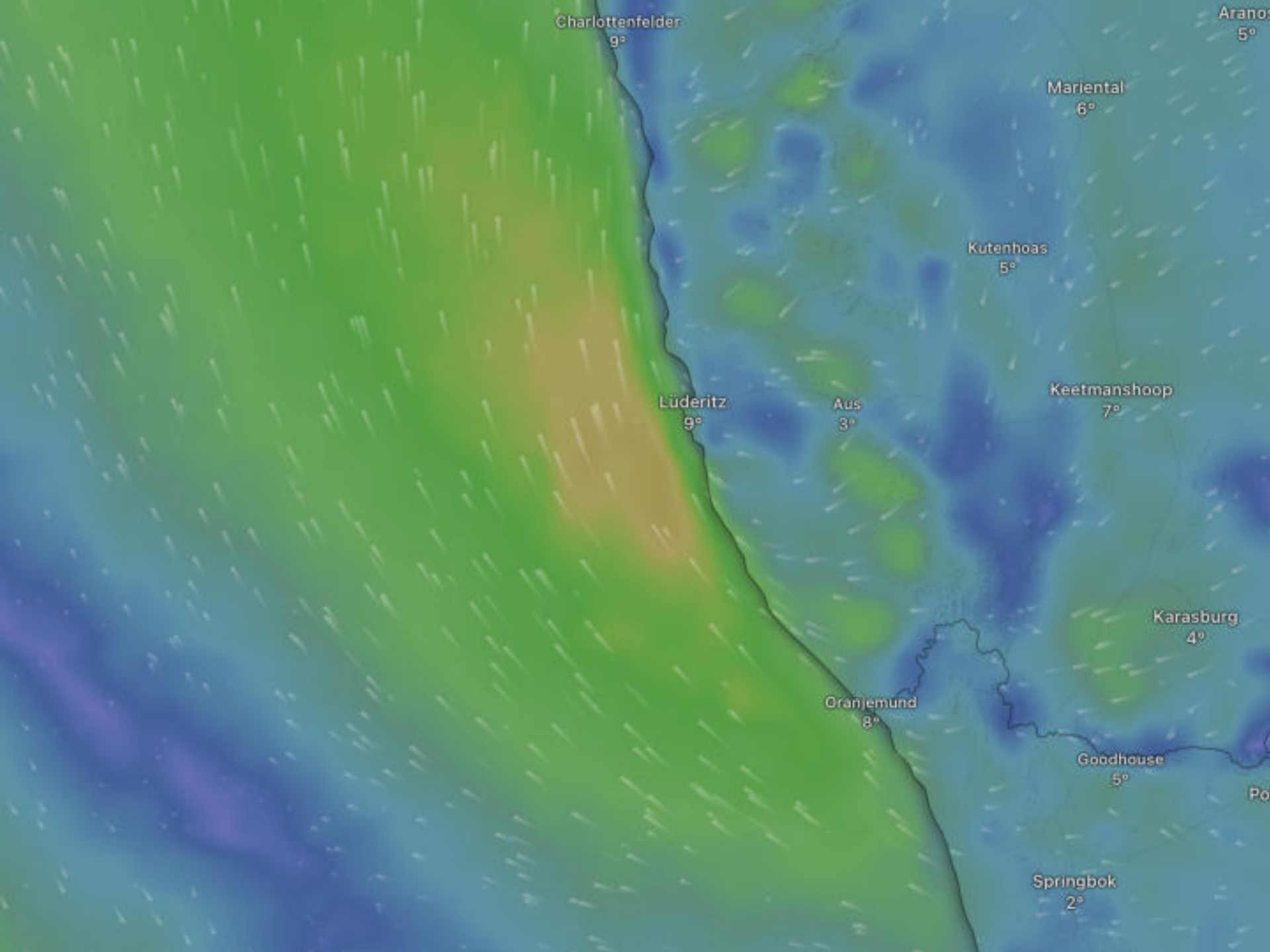
FRIESKA

mean SeaWiFS chlorophyll concentration



The Benguela System is the most productive upwelling system in the world





Charlottenfelder
9°

Aranos
5°

Mariental
6°

Kutenhoas
5°

Keetmanshoop
7°

Lüderitz
9°

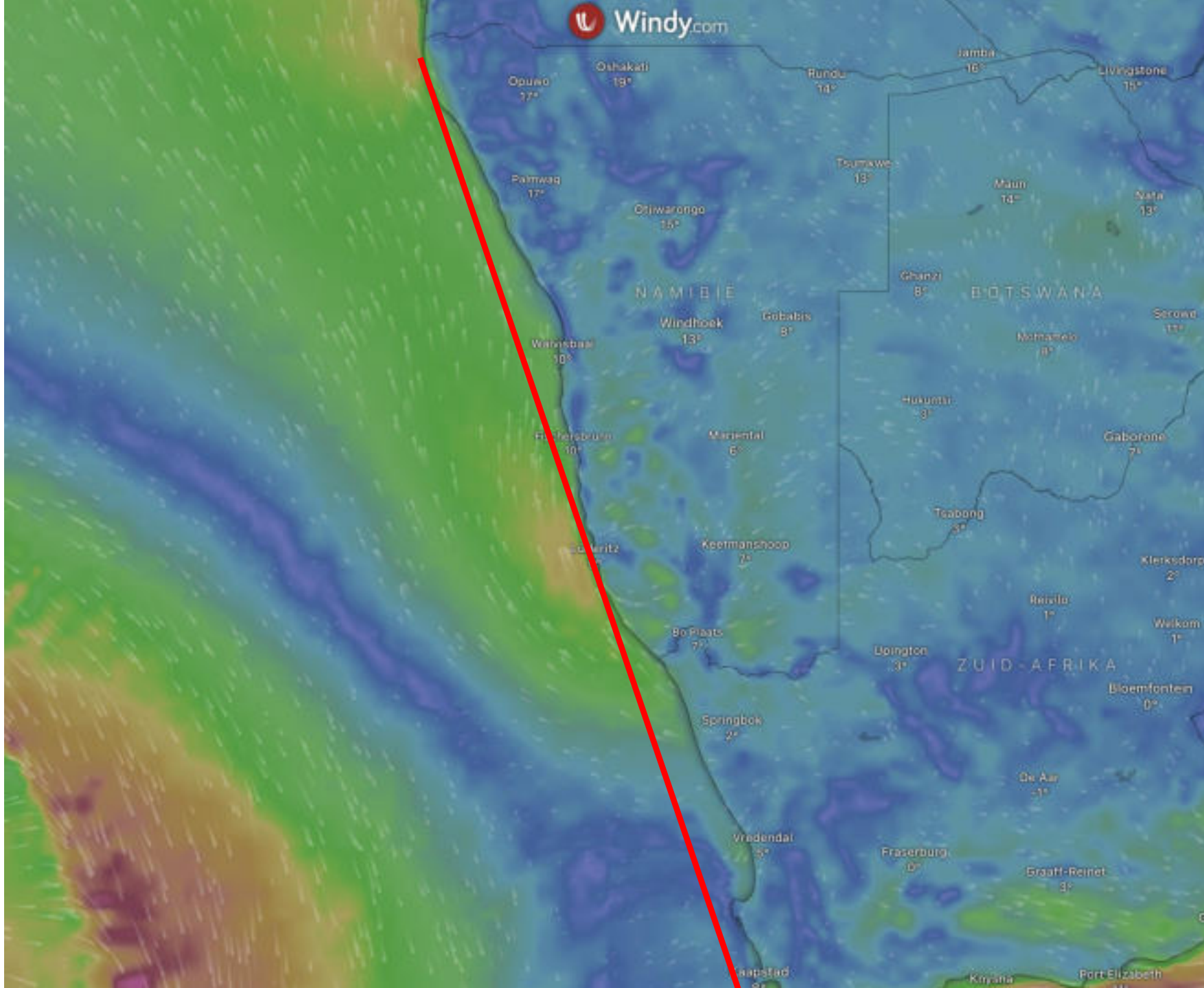
Aus
3°

Karasburg
4°

Oranjemund
8°

Goodhouse
5°

Springbok
2°



https://www.youtube.com/watch?v=8C9p6_qxgEI















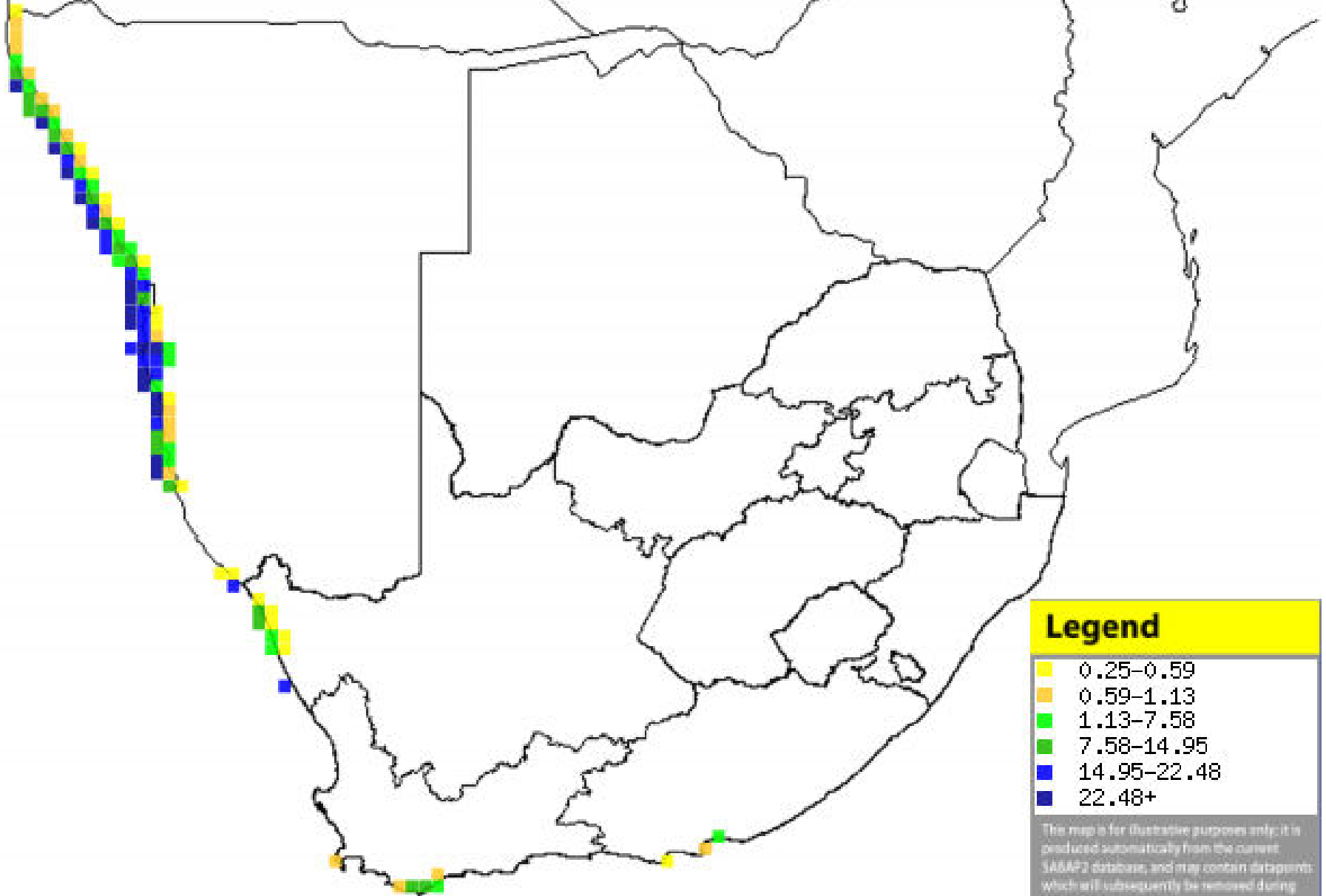
Damara Tern - *Sternula balaenarum*

~23 cm, 50-55 gram.





Damara Tern
Sterna balaenarum



Legend

- 0.25-0.59
- 0.59-1.13
- 1.13-7.58
- 7.58-14.95
- 14.95-22.48
- 22.48+

The map is for illustrative purposes only; it is produced automatically from the current SAMP2 database, and may contain datapoints which will subsequently be removed during checking operations.

Helge Denker 2012

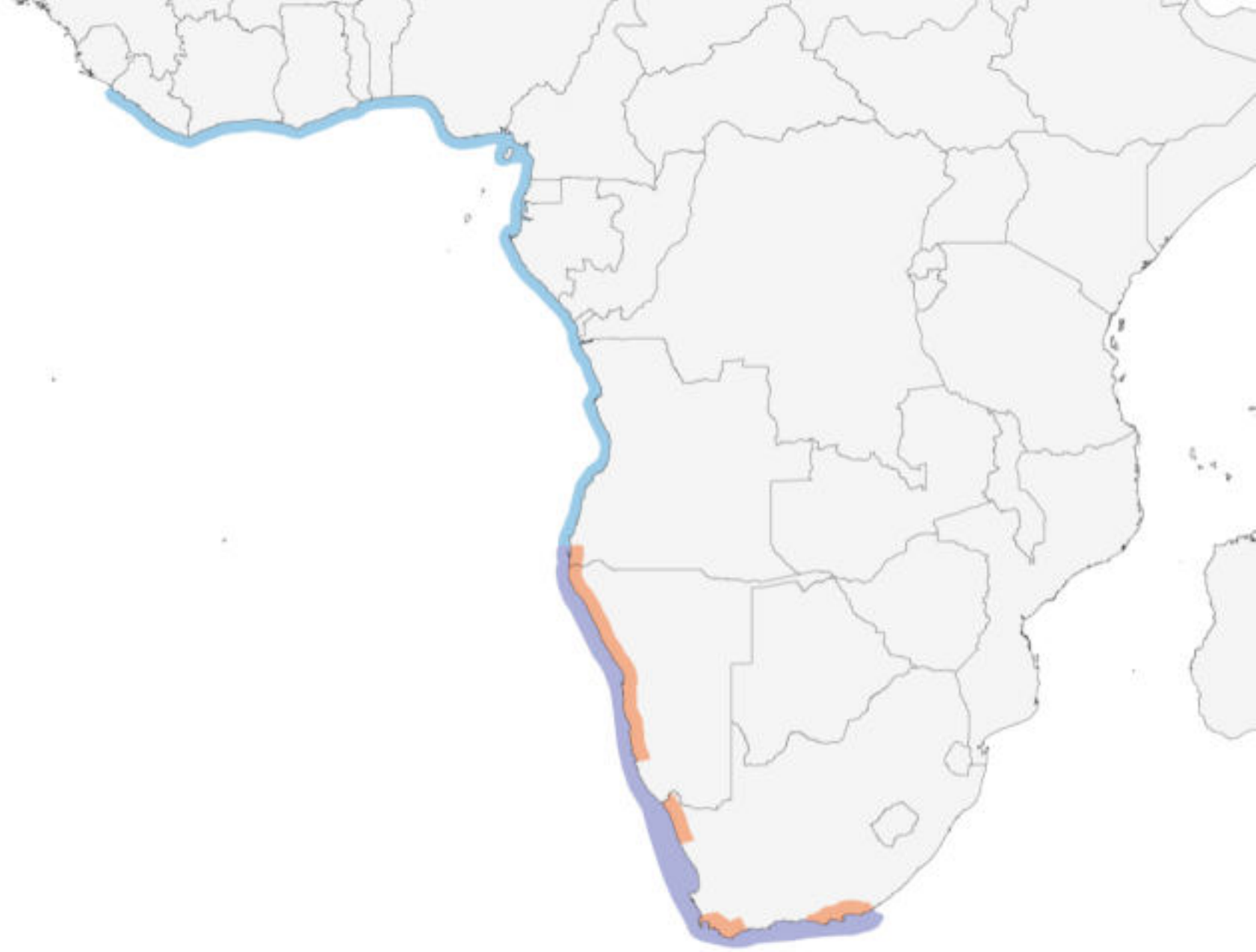
Damara Tern
Sterna balaenarum



ENDEMIC & NEAR-ENDEMIC

of Birds
Namibia

N\$20.00













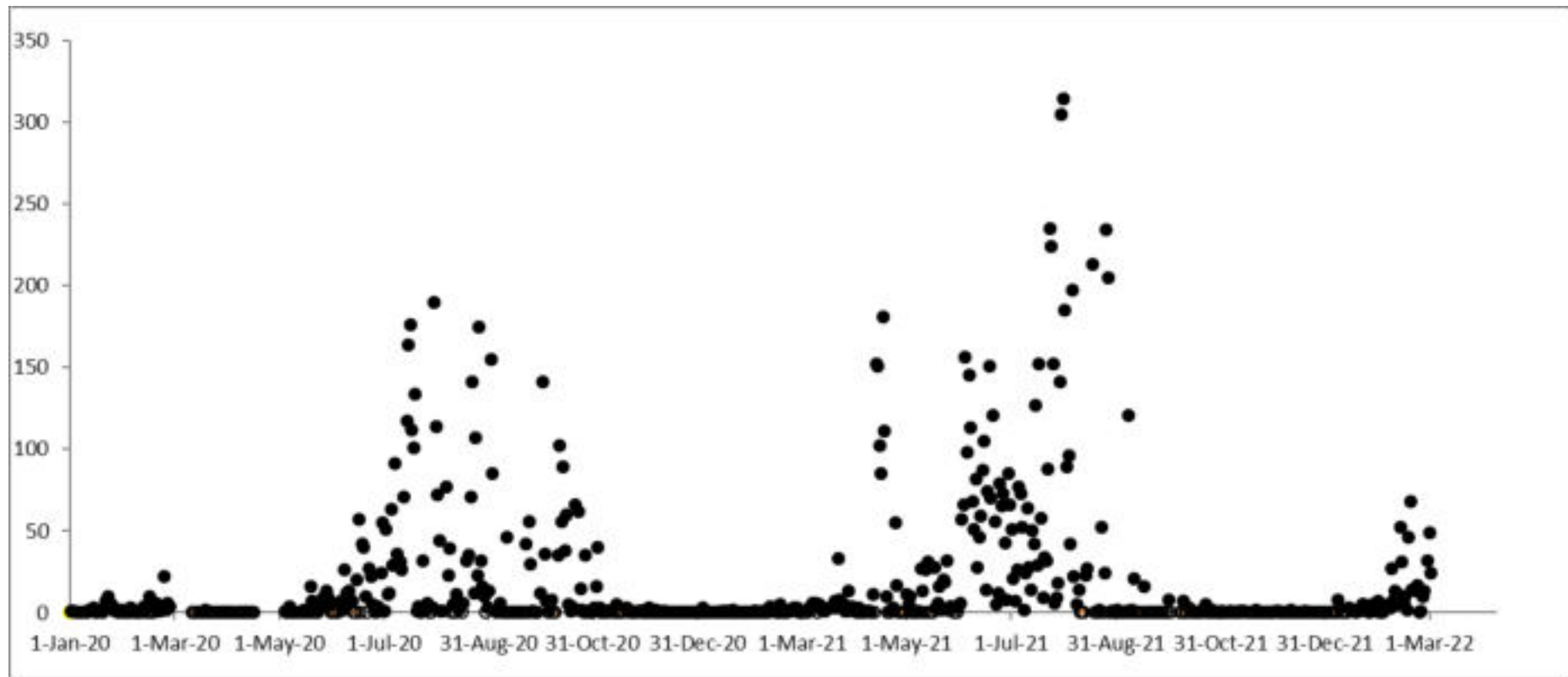


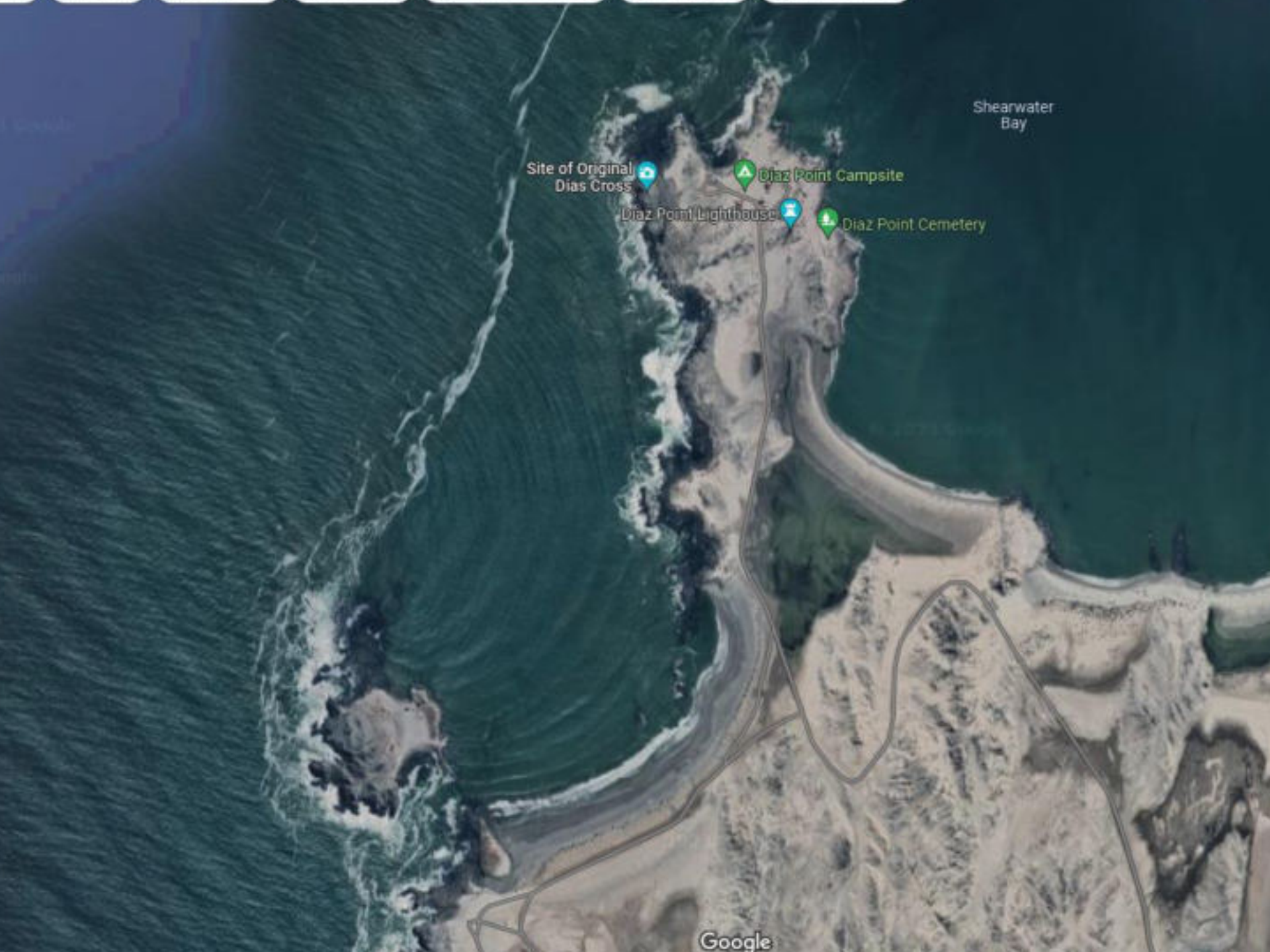
CONSERVATION
AREA
NO GO AREA
FOR ALL VEHICLES



Main knowledge gaps

- Migration: yes or no?
- Breeding: in winter too?





Shearwater Bay

Site of Original Dias Cross

Diaz Point Campsite

Diaz Point Lighthouse

Diaz Point Cemetery

Google





























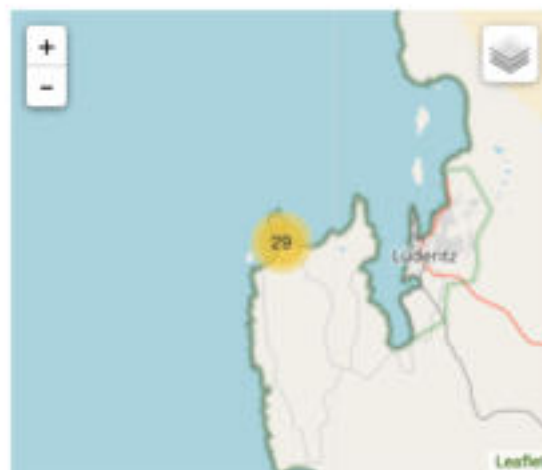


<https://submit.cr-birding.org/animals/85479/3wuLGJCwE4o97T2U4Anv/>

LIFE HISTORY: DAMARASTERN YF-3P

NOG EEN WAARNEMING VAN DEZE VOËL

naam	Yf-3P
colour code(s)	Yf-3P (since 07-07-2021)
metal ring(s)	FPP FH67567 (since 07-07-2021)
geslacht	onbekend
geboortejaar	onbekend (age at first capture: >3 cij)
project	Damarastern, blauwe gele of witte vlag met 2 tekens
coördinator	Ruben Fijn
eerste vangst	7 juli 2021 door Mark Boorman
permanente link	submit.cr-birding.org/animals/85479/3wuLGJCwE4o97T2U4Anv/



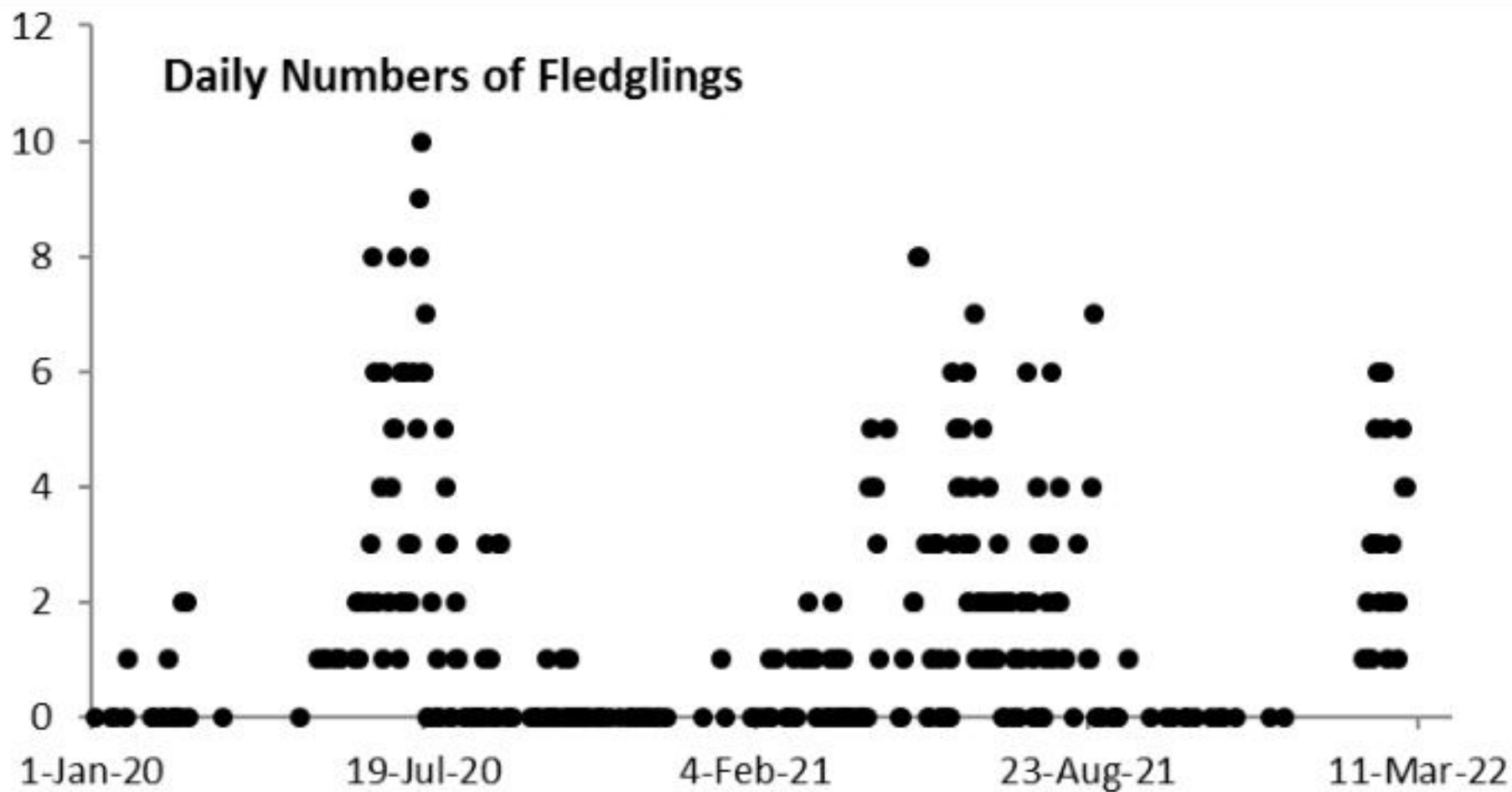
Waarnemingen

status	datum ▼	waarnemer	type	conditie	regio	acties
	2022-10-11	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-10-08	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-10-01	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-09-25	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-09-22	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-09-21	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-09-17	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-09-16	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO
	2022-09-13	Jean-Paul Roux	waarneming	levend en gezond	Shearwater Bay, Luderitz, Namibia (NA)	INFO

Main knowledge gaps

- Migration: yes or no?
- Breeding: in winter too?

Daily Numbers of Fledglings













Searching for colonies



















Hottentotsbaai

© 2023 Google

© 2023 Google











































Datum	Animal	Observer	Species	Region
19-5-2023	Yf-H4 	Mark Boorman	Damarastern - Sterna balaenarum	Hottentot Bay (NA)
10-7-2023	Yf-H4 	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)
14-7-2023	Yf-H4 	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)
15-7-2023	Yf-H4 	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)
28-8-2023	Yf-H4 	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)
29-8-2023	Yf-H4 	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)
25-9-2023	Yf-H4 	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)
2-10-2023	Yf-H4  life history	Jean-Paul Roux	Damarastern - Sterna balaenarum	Shearwater Bay, Luderitz, Namibia (NA)

Main knowledge gaps

- Migration: yes or no?
 - Southern Namibia: probably not...
- Breeding: in winter too?
 - Yes! Well in July birds on eggs, fledging in August...



Break



Educational part

Social Marketing

“a process that applies marketing principles and techniques to create, communicate, and deliver value in order to influence target audience behaviors that benefit society as well as the target audience”
(Kotler, Lee, & Rothschild 2006, p. 26; Grier & Bryant, 2005; Andreasen, 1995)

- **The 4Ps of marketing**

- **Product:**
- **Price (prize):**
- **Place (location):**
- **Promotion (advancement):**

How do you sell a watch?



And ‘protect nature’?



**That is:
Branding behavior!**

- **The 4Ps of social marketing**

- **Product:** Actual vs Core
- **Price:** Literally vs figuratively
- **Place (location):** Action outlets
- **Promotion (promotion):** Persuasive communication strategies
Developing effective messages

United Nations Sustainable Development Goals





NaDEET Urban Sustainability Centre



LAUNDRY DAY

Laundry is an important part of daily life. It helps us keep our clothes clean and fresh. There are many ways to do laundry, and it's important to use the right products and techniques to keep our clothes in good condition.

ARE YOU DRIVING WATER AT THE MACH BACHT?



WHAT IS THE FLOOR ALL ABOUT?



HOW MUCH WATER DO YOU USE?



HOW DID YOU GET HERE?



A large mural depicting a road with various vehicles and signs. The road is lined with trees and buildings. Several signs are placed along the road, each with a circular icon and text. The signs include:

- Sign 1: A circular icon with a car and text.
- Sign 2: A circular icon with a bus and text.
- Sign 3: A circular icon with a truck and text.
- Sign 4: A circular icon with a motorcycle and text.
- Sign 5: A circular icon with a bicycle and text.
- Sign 6: A circular icon with a pedestrian and text.



Eco-House



What is the EcoHouse?

The EcoHouse is a sustainable living space designed to reduce environmental impact through energy efficiency, water conservation, and waste management.

Area	Feature
Living Area	Energy Efficient Lighting
Kitchen	Water Saving Faucet
Bathroom	Low Flow Toilet
Bedroom	Energy Efficient Windows
Overall	Recycled Materials

© 2010 EcoHouse Project

Eco Ave 1





Exploring Namibia

Namib Desert Environmental Education Trust
Namibia, Namibia
DEET Centre - an Environmental Education Centre

- 1. No Poverty
- 2. Zero Hunger
- 3. Good Health and Well-being
- 4. Quality Education
- 5. Gender Equality
- 6. Clean Water and Sanitation
- 7. Affordable and Clean Energy
- 8. Decent Work and Economic Growth
- 9. Industry, Innovation and Infrastructure
- 10. Reduced Inequalities
- 11. Sustainable Cities and Communities
- 12. Responsible Consumption and Production
- 13. Climate Action
- 14. Life Below Water
- 15. Life on Land
- 16. Peace, Justice and Strong Institutions
- 17. Partnerships for the Goals



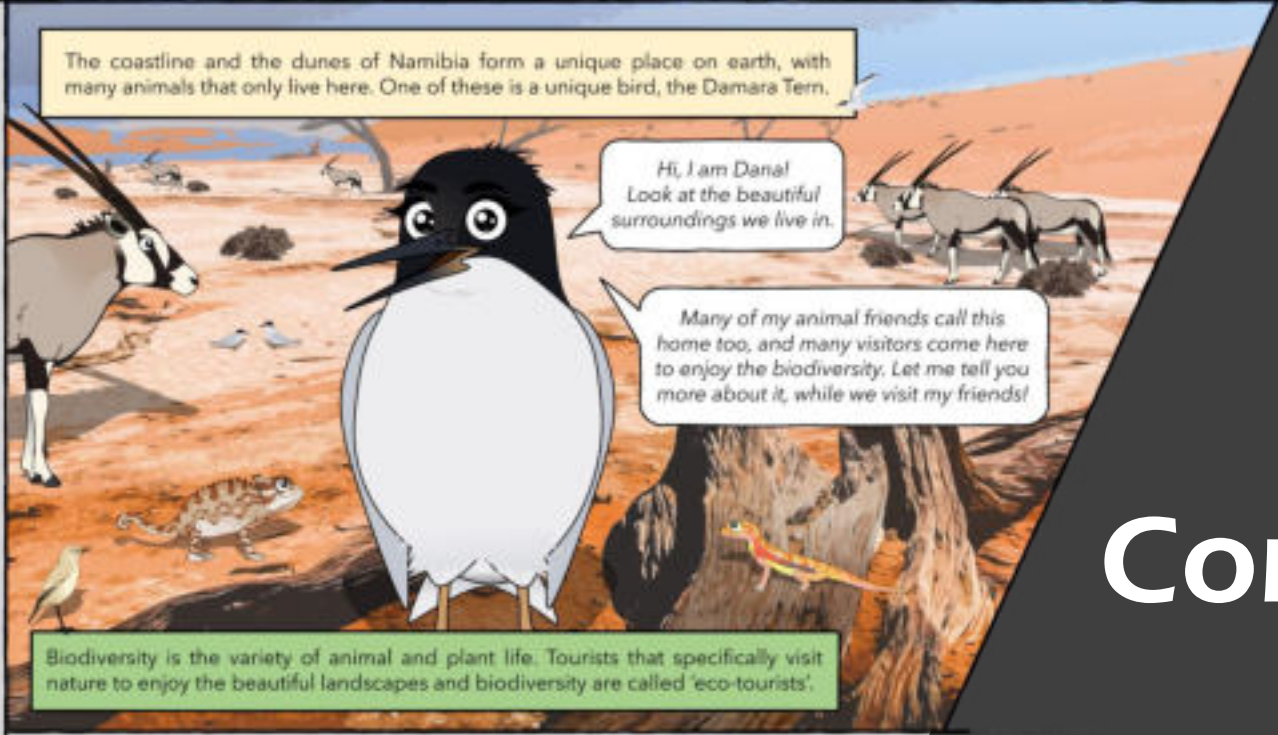


RE 

RENEWABLE
ENERGY
CHEMICALS

- NA
- OR
- INC
- BIO





The coastline and the dunes of Namibia form a unique place on earth, with many animals that only live here. One of these is a unique bird, the Damara Tern.

Hi, I am Dana!
Look at the beautiful
surroundings we live in.

Many of my animal friends call this
home too, and many visitors come here
to enjoy the biodiversity. Let me tell you
more about it, while we visit my friends!

Biodiversity is the variety of animal and plant life. Tourists that specifically visit nature to enjoy the beautiful landscapes and biodiversity are called 'eco-tourists'.

Comic

The power of comics

- **Narratives** (e.g., [De Graaf et al., 2014](#))
 - ✓ Storyline: Underlying structure
 - ✓ At least 1 character
 - ✓ Who goes through at least 1 (concrete) event
 - ✓ In a specific setting (time, place)
- **Working mechanisms:**
 - ✓ Transportation
 - ✓ Availability heuristic
 - ✓ Risk-as-feelings
- **Decisions for development of comic on:**
 - ✓ Content
 - ✓ Text
 - ✓ Visuals

Development of comic

Content

- **The storyline content focuses on:**
 - ✓ Damara Tern / School girl
 - ✓ Habitat (coastal dunes)
 - ✓ Biodiversity
 - ✓ **Pro-environmental behaviors**
 - ✓ Respect protected areas
 - ✓ Garbage management
 - ✓ Lower disturbance
 - ✓ Social interaction about conservation
 - ✓ **Cues-to-action**
 - ✓ What can **you** do?

Now it's time
to take
your turn!



Development of comic



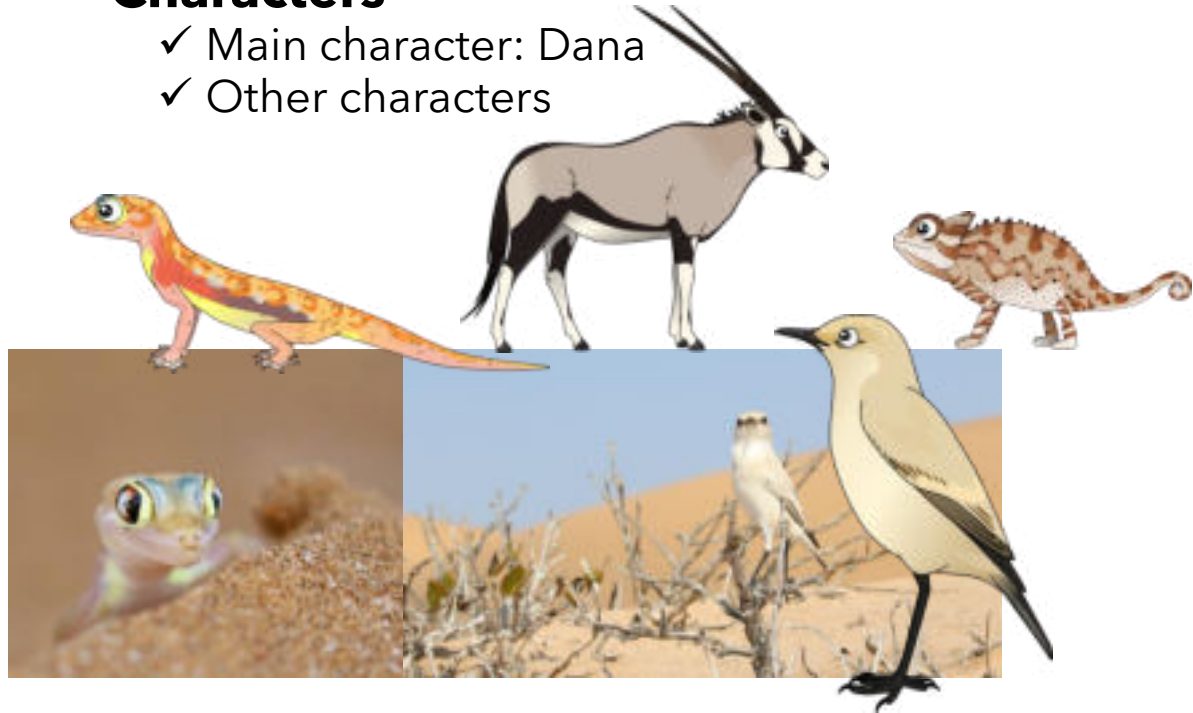
Development of comic

Visuals



- **Characters**

- ✓ Main character: Dana
- ✓ Other characters



- **Perspective taking**

- ✓ Human-perspective
- ✓ Animal-perspective

Development of comic



Text

Framing of text

- **Gain frame**
 - ✓ Benefits of performing the recommended behavior
 - ✓ Benefits of not performing the unwanted behavior
- **Loss frame**
 - ✓ Costs of performing the unwanted behavior
 - ✓ Costs of not applying the recommended behavior

Gain:

*"Yes. If they **stay out**, the ground nests of Damara Terns and burrows of small animals stays intact, and our living environment remains untouched." If **we respect** protected areas, then we are respecting our biodiversity!*

Loss:

*"Yes. If they **do enter**, the ground nests of Damara Terns and burrows of small animals will be destroyed, and our living environment is disturbed." If **we disrespect** protected areas, then we are disrespecting our biodiversity!*

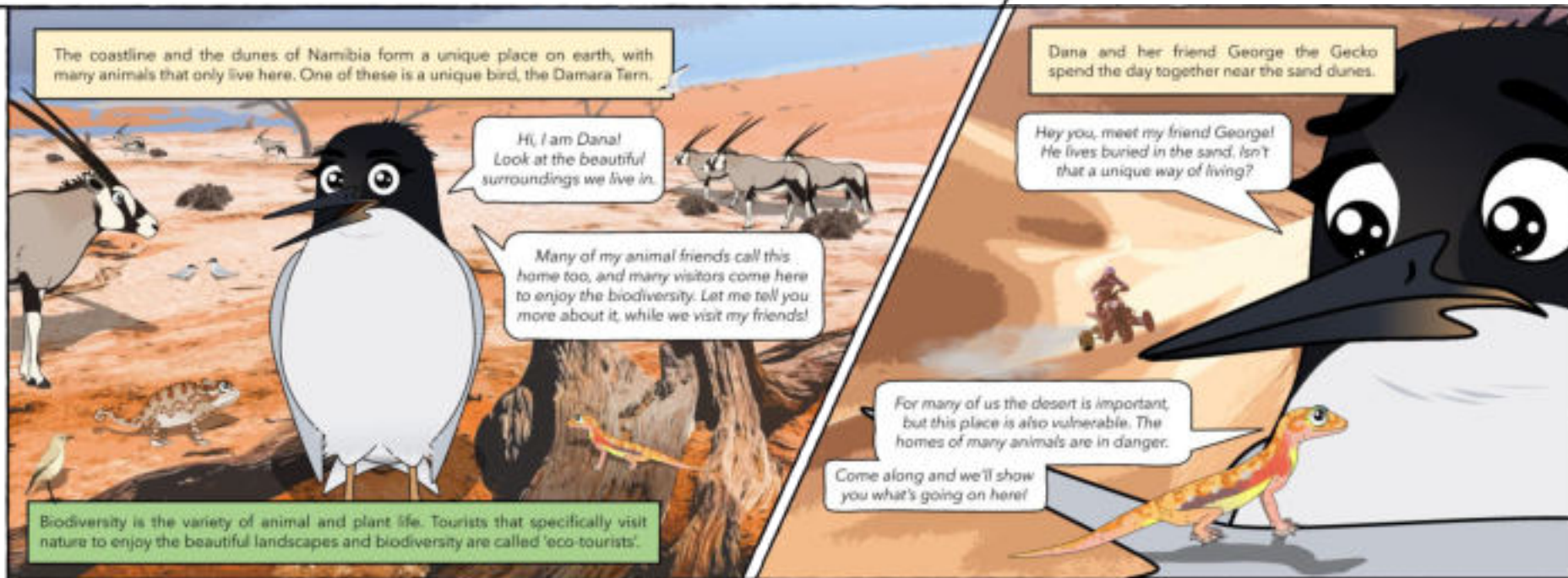
Development of comic

Does Dana take a turn?

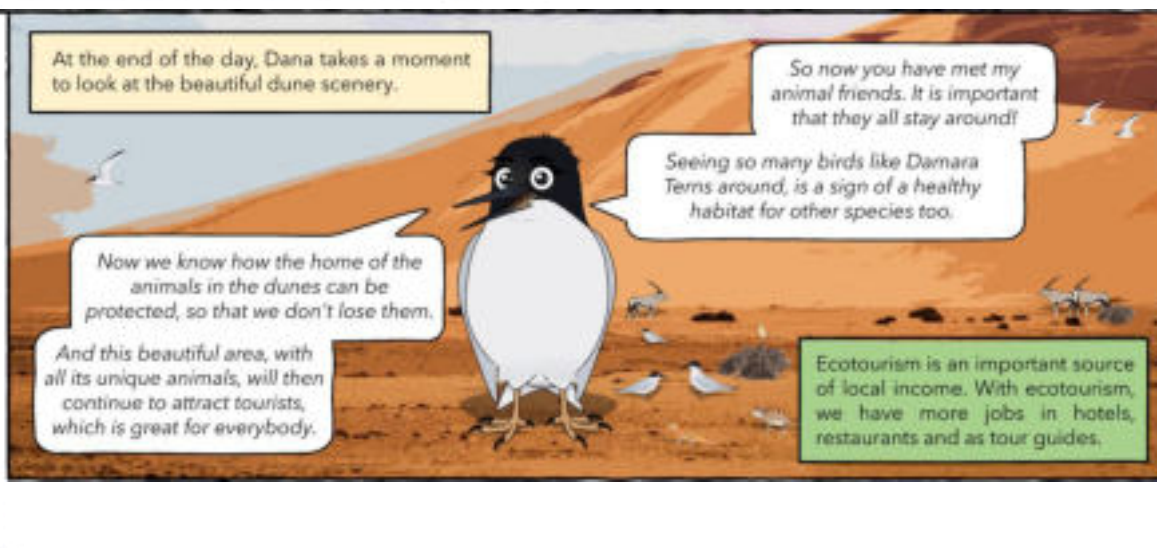
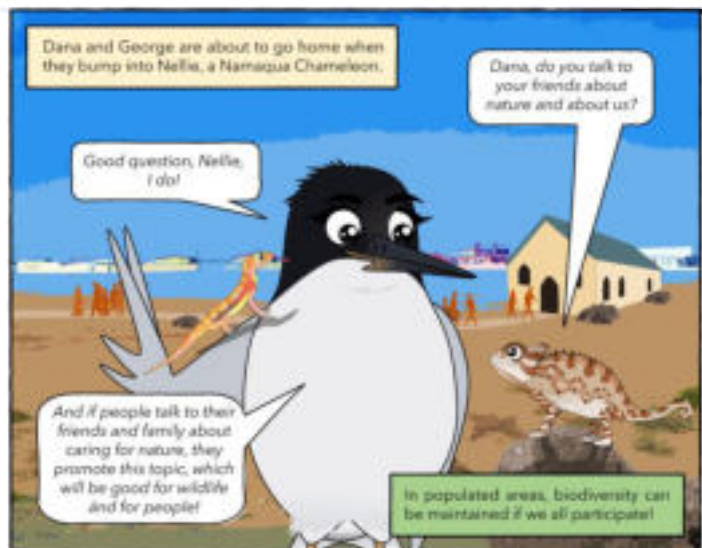
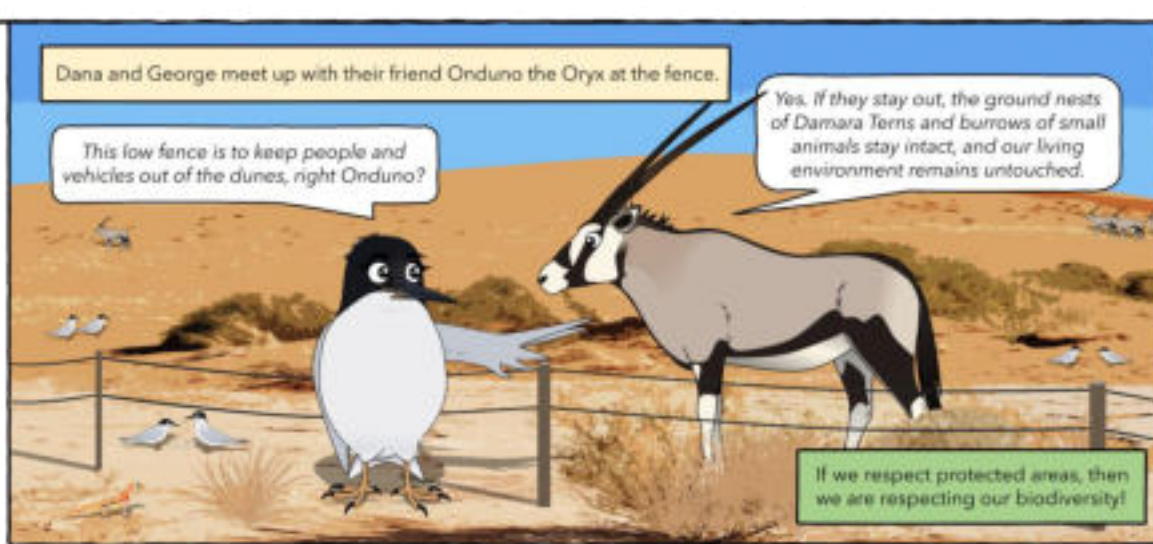
"A true-life story by Dana, a Damara Tern"



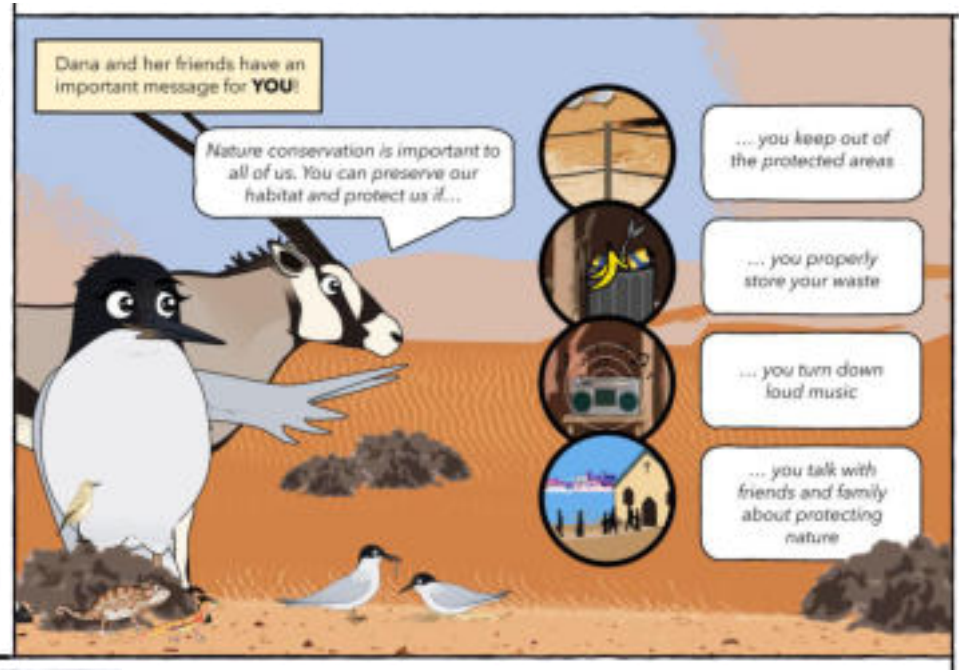
Drawings by: Bas Engels, Text by: Jolanda Veldhuis, Ruben Fijn & Elena Somers



Development of comic



Development of comic

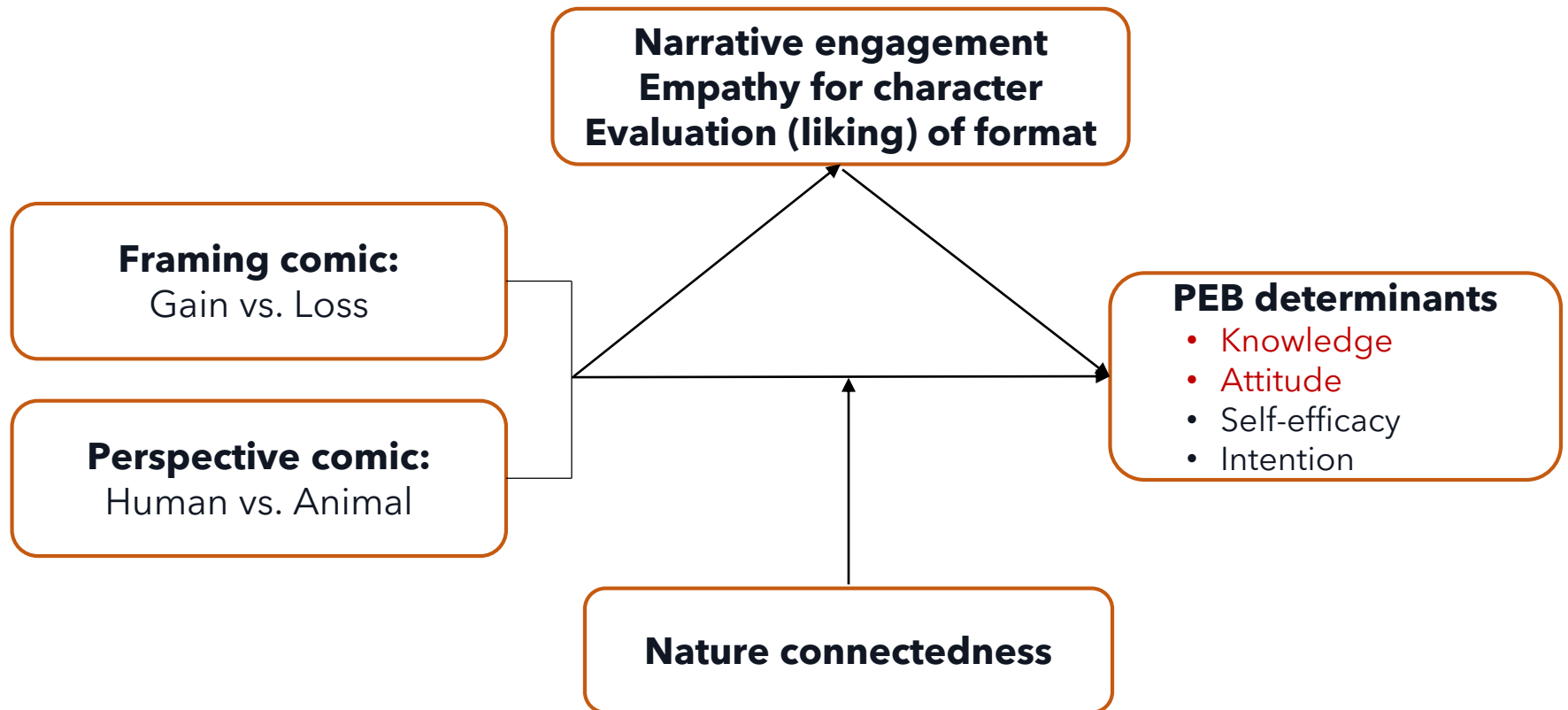


Now it's time
to take
your turn!

you
teRn
project

Set-up Study 1

- A 2 (framing: gain vs. loss) x 2 (perspective: human vs. animal) experimental design
- 4 versions of the comic (plus a control group)
- Random assignment to one of the five conditions
- Paper-pencil-questionnaire



Gain frame with the bird as main character



Gain frame with the human as main character



Loss frame with the bird as main character



Loss frame with the human as main character





Results study 1

Respondents:

- 108 pupils: $M_{age} = 13.07$, $SD_{age} = 1.03$; range 11-16 yrs; 63.8% girls, 36.2% boys
- School: 6 grade - 8 grade, from 6 different school region Swakopmund
- Language at school: all English
- Language at home: Afrikaans (22.8%), Oshikwanyama (19.8%), Oshindonga (14.9%), Khoekhoegowab (13.9%), English (13.9%), Otjiherero (18.9%), Other (5.9%)



Praat
JY DIE
taal?



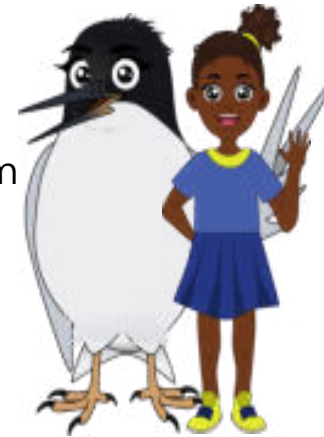
Manipulation check:

- Both frames: perceived equally to be about 'nature/biodiversity protection'
- Loss frame: perceived as being more about 'nature loss' than gain (as aimed for)

Results study 1

Outcomes PEB-determinanten

- **Framing:**
Gain frame instigated higher intentions to pro-environmental behavior than loss
- **Perspective:**
Animal and human perspective had equal reactions to them



Matisa & Dana

- ✓ More **positive evaluation** of the format
- ✓ Higher **engagement** with story
- ✓ More **empathy** for character
- ✓ Higher **connectedness** with nature

.... more feelings of **having control** over **and higher intentions** to perform pro-environmental behavior





Board game

Gamification

- **Definition:** The use of game design elements in non-game contexts
(Cugelman, 2013; Detering et al., 2011)

- **Working mechanisms:**

- ✓ Cognitive task absorption
- ✓ Engagement
- ✓ Flow
- ✓ Social interactivity

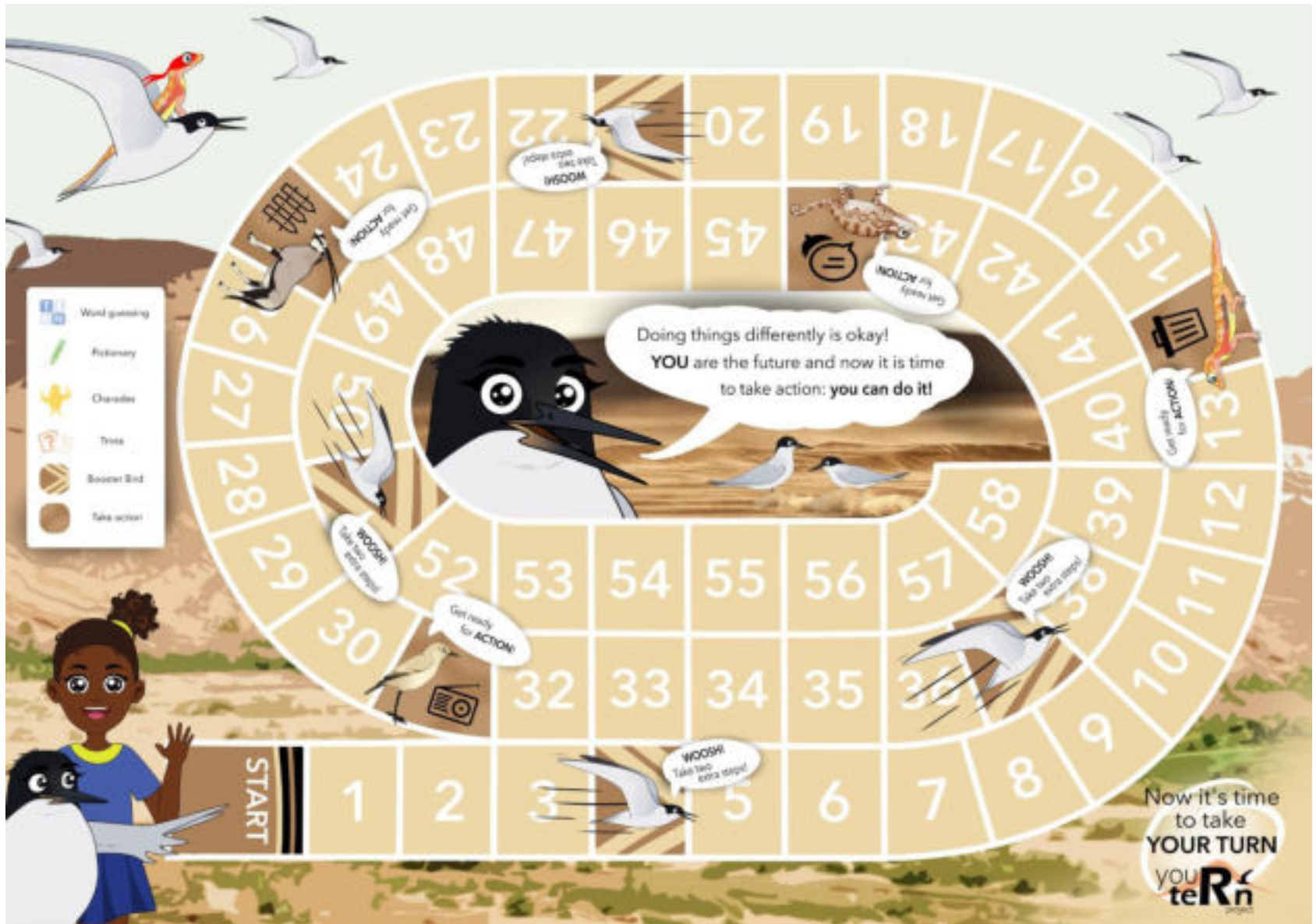


- **Persuasive strategies for gamification**

- ✓ Goal setting
- ✓ Capacity to overcome challenges
- ✓ Providing feedback on performance
- ✓ Reinforcement
- ✓ Compare progress
- ✓ Social connectivity
- ✓ Fun and playfulness



Development of board game



Meet The Players

In the game these characters have an important message for YOU!



Hi, I am Matisa, a Damara Tern.

I am a seabird catching fish and squid in the ocean. About 98% of my species breeds in Namibia, on gravel plains between the dunes in the desert. My nest is just a scrape in the ground!



Hi, I am Dana, a Namibian girl.

I go to school and like to learn about nature and how I can help to protect animals and their habitat. My hobbies are dancing, reading and hanging out with my friends. I live close to the sand dunes!



Hi, I am George, a Namib Sand Gecko.

I am a small reptile hunting on crickets and other small insects. The sand dunes and rocky plains in between dunes are my prime habitat. During the day I live buried in the sand. What a unique way of living!



Hi, I am Nellie, a Namaqua Chameleon.

I am a large reptile catching beetles and other insects with my sticky tongue. My skin color changes through the day being dark in the morning to absorb heat and lighter during the heat to reflect sunlight!



Hi, I am Onduno, a South African Oryx.

I am a large antelope grazing grass or browsing from bushes and shrubs. I take most of my fluids from my food and do not need to drink a lot. That's how I can withstand the desert!



Hi, I am Tuyakula, a Tractrac Chat.

I am a small songbird that eats insects such as beetles, butterflies and locusts. My nest is on the ground and is scraped in the soil underneath a bush. The nest itself is lined with straws!

The Playing Cards

Check the symbols on the playing cards and see what to do. There are 4 different assignment categories.

Now it is your turn to take some action: You can do it

Pictionary (green)

Make a drawing of the word that is on the card (without talking, using gestures or writing down letters or numbers). Use the provided paper and pencils. Your teammates try to guess what you are drawing.



Charades (yellow)

Use gestures and facial expressions to express the word(s) on the card. You can make sounds that have to do with the word (but not mention the word). Your team members try to guess what you are portraying.



Word guessing (blue)

Describe the word-in-bold on the card to your teammates. Use full sentences, without mentioning the actual word or parts of it. Use at least the 4 words also on the card. Your teammates try to guess what you are describing.



Trivia (orange)

Read the question and the answering options on the card out loud to your teammates. Your teammates can only give one answer that they think is correct: A, B or C.



Text



Does Matisa take a turn?

"A true-life story by Matisa, a Damara Tern"

Drawings by: Sisi Engels, Text by: Jolanda Woldhuis, Ruben Fijn & Elena Somers



The coastline and the dunes of Namibia form a unique place on earth, with many animals that only live there. One of these is a unique bird, called a Damara Tern. One of the birds is Matisa, who says: "Hi, I am Matisa! Look at the beautiful surroundings we live in. Many of my animal friends call this home too, and many visitors come here to enjoy the biodiversity. Let me tell you more about it, while we visit my friends!". Biodiversity is the variety of animal and plant life. |

Matisa and her friend George the Gecko spend the day together near the sand dunes. Matisa introduces George: "Hey you, meet my friend George! He lives buried in the sand. Isn't that a unique way of living?". George responds: "For many of us the desert is important, but this place is also vulnerable. The homes of many animals are in danger. Come along and I will show you what's going on here!".

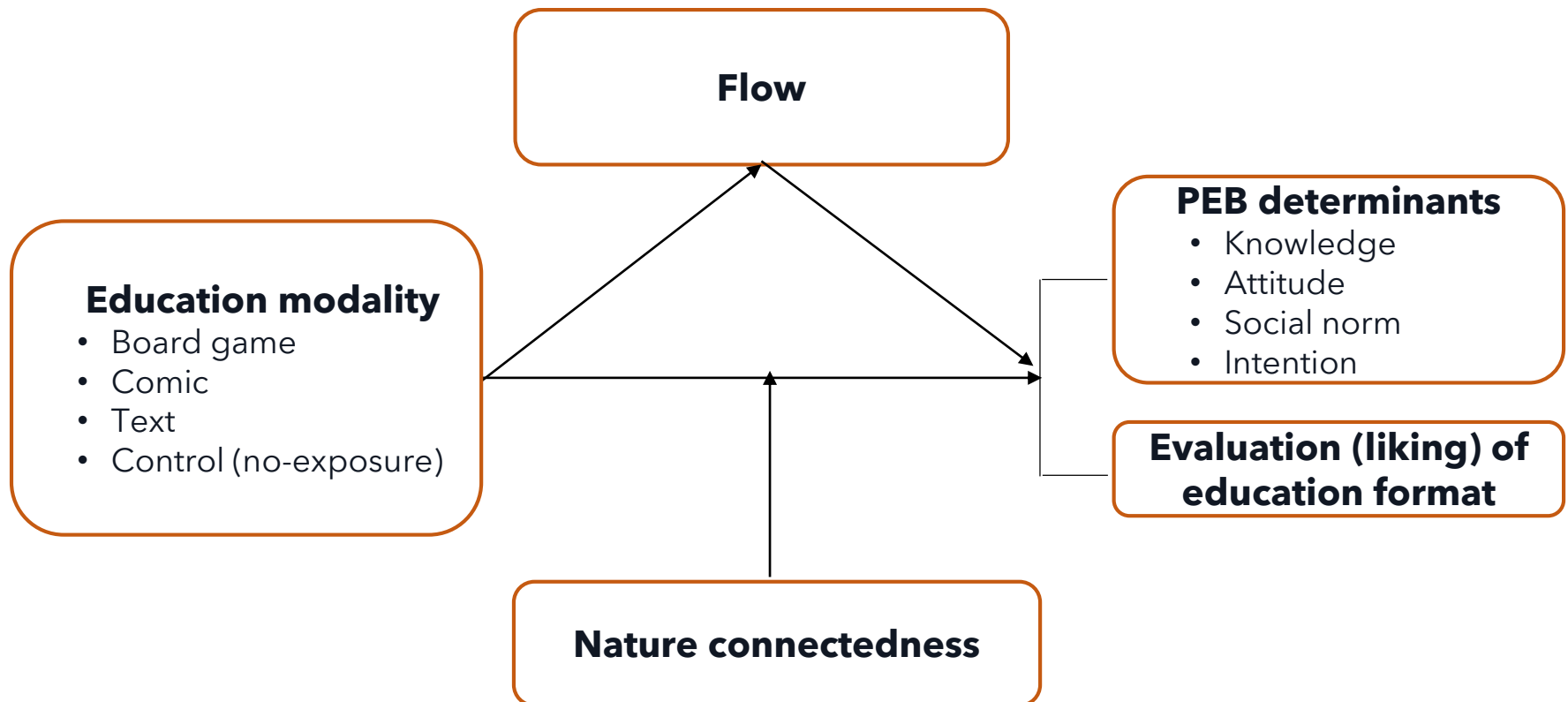
Matisa and George meet up with their friend Onduno the Oryx at the fence. Matisa asks: "This low fence is to keep people and vehicles out of the dunes, right Onduno?". Onduno confirms: "Yes. If they stay out, the ground nests of Damara Terns and burrows of small animals stay intact, and our living environment remains untouched.". If we respect protected areas, then we are respecting our biodiversity!

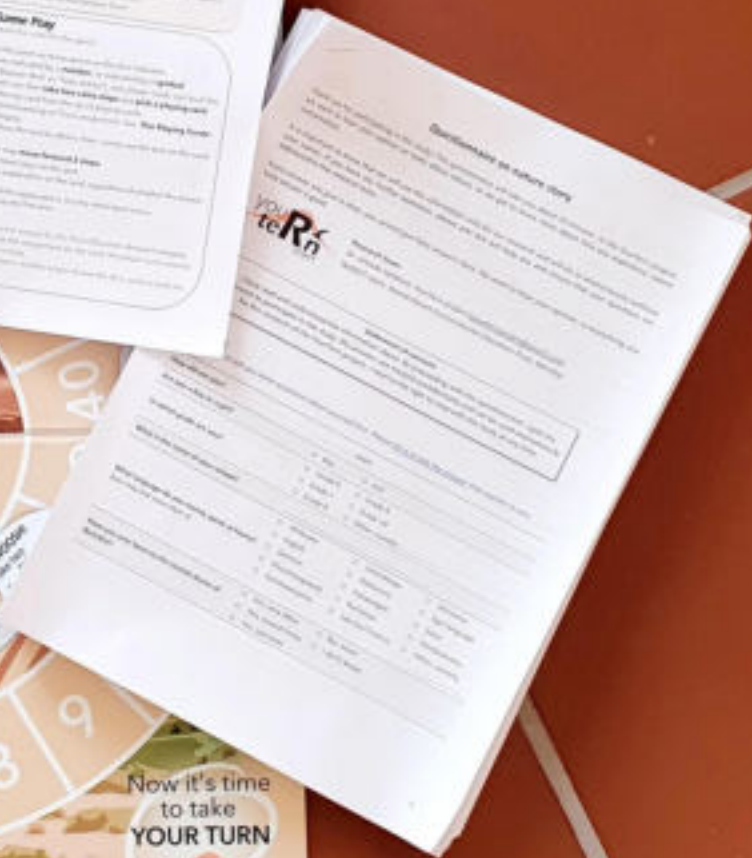
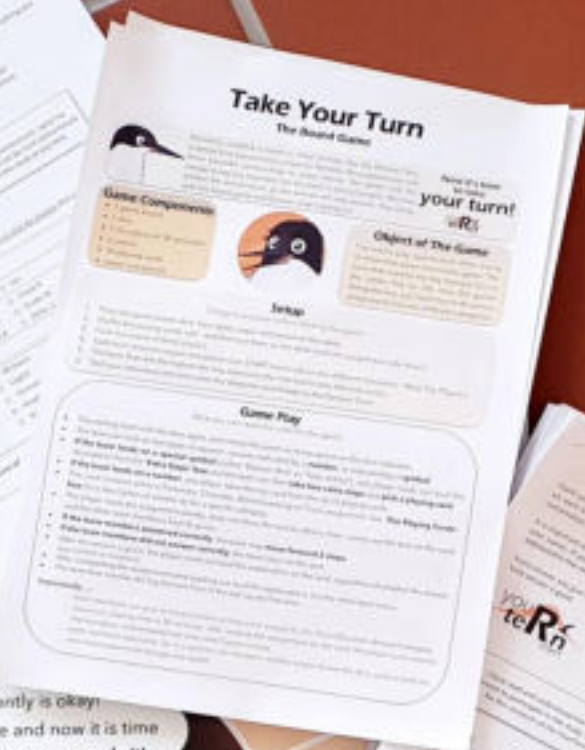
After seeing Onduno, they see their friend Tuyakula, a Tractrac Chat. "Hey, what is that nice tune?", Tuyakula asks. Matisa tells: "Ah, Tuyakula! This cuca shop owner loves nature. He plays the music softly. Reducing the volume keeps animals around". George adds: "I am also happy! Check out the garbage bin!". Matisa: "Wow I see, George! If people put waste in a proper bin, animals are not harmed by it.". If we don't play music too loud and properly store our waste, animals will be relaxed!

Matisa and George are about to go home when they bump into Nellie, a Namaqua Chameleon. Nellie asks: "Matisa, do you talk to your friends about nature and about us?". Matisa replies: "Good question Nellie, I do! And if people talk to their friends and family about caring for nature, they promote this topic, which will

Set-up Study 2

- A unifactorial (multimodality: text vs. comic vs. board game) experimental design
- Control group
- Random assignment to one of the four conditions
- Paper-pencil-questionnaire

























Exploring Namibia

THE 17 GOALS

1. No Poverty	2. Zero Hunger	3. Good Health and Well-being	4. Quality Education	5. Gender Equality	6. Clean Water and Sanitation	7. Affordable and Clean Energy	8. Decent Work and Economic Growth	9. Industry, Innovation and Infrastructure	10. Reduced Inequalities	11. Sustainable Cities and Communities	12. Responsible Consumption and Production	13. Climate Action	14. Life Below Water	15. Life on Land	16. Peace, Justice and Strong Institutions	17. Partnership for Sustainable Development
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Check Namibia's progress on the SDGs

Check Namibia's progress on the SDGs. The infographic displays various icons representing different Sustainable Development Goals and their corresponding progress indicators.

Results study 2

Respondents:

- 120 pupils: $M_{age} = 13.56$, $SD_{age} = 1.85$; range 10-18 yrs; 62.2% girls, 37% boys
- School: majority from grade 6 - grade 8; some grade 5, grade 9, grade 10
- Language at school: all English
- Language at home: English (43.7%), Afrikaans (34.4%), Oshikwanyama (17.6%), Oshindonga (13.4%), Khoekhoegowab (11.8%), Otjiherero (8.4%), Rukwangali (5%), other languages (19.3%)
- Visited the dunes: often (16%), several times (28.6%), once (33.6%), never (16%)

Results study 2



VS

Does Matisa take a turn? "A true-life story by Matisa, a Damara Tern"



Board game versus comic and story:

- More social interaction and social connection
- More positive evaluation of the format
- More PEB-knowledge

Board game vs control:

- More positive attitude towards PEB

And: Playing boardgame and reading the comic or the story: experienced the educational materials as equally being about nature protection, confirming the educational purpose of all three types.

Results study 2

Descriptive statistics of gamification elements (on 1-to-7-point scales)



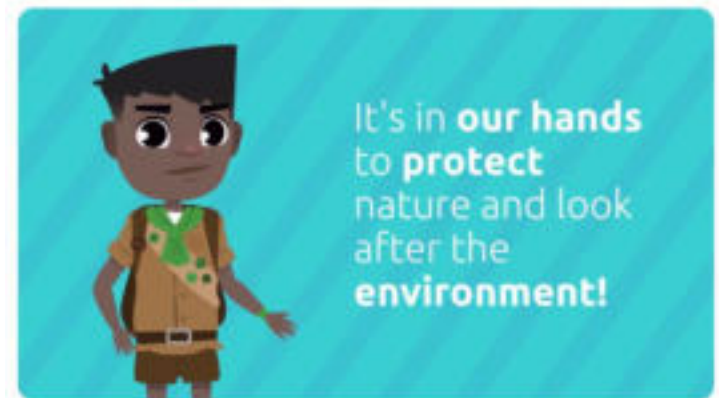
Gamification: <i>While playing the game...</i>	<i>M</i>	<i>SD</i>
... I had to do tasks to proceed	6.08	.17
... I was making progress	5.95	.18
... I had to achieve a specific goal	5.82	.19
... I gained rewards for what I was doing	5.13	.31
... I received feedback on how I was doing	5.03	.20

Results study 2

Nature connectedness

- Children with a higher connectedness to nature, also showed more positive attitudes and social norms as well as higher intentions to perform pro-environmental behaviour.
- Yet, they responded similarly to the different educational modalities in terms of PEB-determinants (no moderation by nature connectedness)

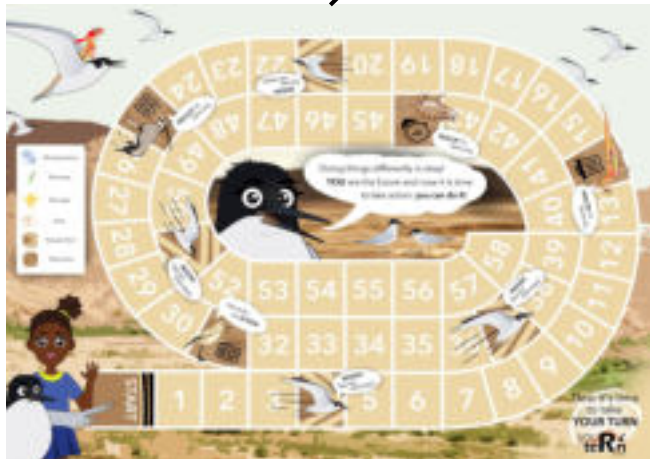
**Love
NATURE**



Results study 2

Flow

- Flow = Time flew by; could easily concentrate; felt nicely challenged; was focused; completely immersed; evoked emotions; really involved in
- **Board game** creates significantly **more flow** than comic and story, leading to **more positive outcomes**



Flow

PEB determinants

- Knowledge
- Attitude
- Social norm
- Intention

Evaluation (liking) of education format

From beach and dunes to classrooms ...







**CONSERVATION
AREA**

INTERNATIONAL WETLANDS
TREATY



Ideas for future research

Ecology

- ✓ Colourringing
- ✓ More day-roosts?
- ✓ Satellite trackers
- ✓ ...

Environmental education content

- ✓ Summer school on birds
- ✓ Cultural and spiritual context
- ✓ VR experience
- ✓ ...

Collaborations

- ✓ NaDEET
- ✓ Students: Namibia & the Netherlands
- ✓ ...





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