

Using
Return-on-Investment
To Identify
Conservation Priorities
in Africa

Tim Tear
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Courtesy Ian Murphy

Courtesy Ian Murphy

Summary

Purpose:

- To bring greater credibility to the selection of The Nature Conservancy's Africa Program conservation priorities.

Design:

- To use ROI-thinking to help shape the analysis.

Results:

- Multiple layers of information were developed and used to guide diverse conservation decisions.

Conclusion:

- ROI was helpful – and we are using the results to inform conservation decisions.
- There is a great need to improve databases that support an ROI framework, especially cost data, and for use at smaller spatial scales.

What is Return-on-Investment?

ROI components :

1. Return Value
2. Probability of Success
3. Cost of Effort

$$\text{ROI} = \frac{\text{Return X Probability of Success}}{\text{Cost}}$$

Why do we need Return-on-Investment Thinking?

- Prioritization without cost =
money is not important
- Incorporating cost early in
prioritization process
changes the answer

Why do we need
it now in Africa?

Africa is a big place

The True Size of Africa

A small contribution in the fight against rampant *Immappancy*, by Kai Krause

Graphic layout for visualization only (some countries are cut and rotated)
But the conclusions are very accurate: refer to table below for exact data

COUNTRY	AREA x 1000 km ²
China	9.597
USA	9.629
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221



Top 100 Countries

Area in square kilometers, Percentage of World Total
Sources: Britannica, Wikipedia, Almanac 2010

	AREA km ²	%	
1	Russia	17,098,242	11,50
2	Canada	9,984,670	6,70
3	China	9,596,961	6,40
4	United States	9,629,091	6,40
5	Brazil	8,514,877	5,70
6	Australia	7,692,024	5,20
7	India	3,287,283	2,30
8	Argentina	2,780,400	2,00
9	Kazakhstan	2,724,900	1,80
10	Sudan	2,505,813	1,70
11	Algeria	2,381,741	1,60
12	Congo	2,344,858	1,60
13	Greenland	2,166,086	1,50
14	Saudi Arabia	2,149,690	1,40
15	Mexico	1,964,375	1,30
16	Indonesia	1,860,360	1,30
17	Libya	1,759,540	1,20
18	Iran	1,628,750	1,10
19	Mongolia	1,564,100	1,10
20	Peru	1,285,216	0,86
21	Chad	1,284,000	0,86
22	Niger	1,267,000	0,85
23	Angola	1,246,700	0,85
24	Mali	1,240,192	0,83
25	South Africa	1,221,037	0,82
26	Colombia	1,141,748	0,78
27	Ethiopia	1,104,300	0,74
28	Bolivia	1,098,581	0,74
29	Mauritania	1,025,020	0,69
30	Egypt	1,002,000	0,67
31	Tanzania	945,987	0,63
32	Nigeria	923,768	0,62
33	Venezuela	912,050	0,61
34	Namibia	824,116	0,55
35	Mozambique	801,590	0,54
36	Pakistan	796,095	0,53
37	Turkey	783,562	0,53
38	Chile	756,102	0,51
39	Zambia	752,612	0,51
40	Myanmar	676,578	0,45
41	Afghanistan	652,090	0,44
42	Somalia	637,657	0,43
43	France	632,834	0,43
44	C. Africa Rep	622,984	0,42
45	Ukraine	603,500	0,41
46	Madagascar	587,041	0,39
47	Botswana	582,000	0,39
48	Kenya	580,367	0,39
49	Yemen	527,968	0,35
50	Thailand	513,120	0,34
51	Spain	505,992	0,34
52	Turkmenistan	486,100	0,33
53	Cameroon	475,442	0,32
54	Papua New Guinea	462,840	0,31
55	Uzbekistan	447,400	0,30
56	Morocco	446,550	0,30
57	Sweden	441,370	0,30
58	Iraq	438,317	0,29
59	Paraguay	406,752	0,27
60	Zimbabwe	390,757	0,26
61	Japan	377,930	0,25
62	Germany	357,114	0,24
63	Rep o.t. Congo	342,000	0,23
64	Finland	338,419	0,23
65	Vietnam	331,212	0,22
66	Malaysia	330,803	0,22
67	Norway	323,802	0,22
68	Côte d'Ivoire	322,403	0,22
69	Poland	312,685	0,21
70	Oman	309,500	0,21
71	Italy	301,336	0,20
72	Philippines	300,000	0,20
73	Burkina Faso	274,222	0,18
74	New Zealand	270,467	0,18
75	Gabon	267,668	0,18
76	Western Sahara	266,000	0,18
77	Ecuador	256,369	0,20
78	Guinea	245,857	0,17
79	United Kingdom	242,900	0,16
80	Uganda	241,038	0,16
81	Ghana	238,539	0,16
82	Romania	238,391	0,16
83	Laos	236,800	0,16
84	Guyana	214,969	0,14
85	Sri Lanka	207,800	0,14
86	Kyrgyzstan	199,951	0,13
87	Senegal	198,732	0,13
88	Syria	185,180	0,12
89	Cambodia	181,035	0,12
90	Uruguay	178,215	0,12
91	Suriname	163,820	0,11
92	Tunisia	163,910	0,11
93	Nepal	147,161	0,10
94	Bangladesh	143,998	0,10
95	Tajikistan	143,100	0,10
96	Greece	131,957	0,09
97	Nicaragua	130,373	0,09
98	North Korea	120,538	0,08
99	Belawi	118,484	0,08
100	Eritrea	117,600	0,08
TOP 100 TOTAL	132.632.524	89,34	



In addition to the well known social issues of *illiteracy* and *innumeracy*, there also should be such a concept as "*immappancy*", meaning *insufficient geographical knowledge*.

A survey with random American schoolkids let them guess the population and land area of their country. Not entirely unexpected, but still rather unsettling, the majority chose "*1-2 billion*" and "*largest in the world*", respectively.

Even with Asian and European college students, geographical estimates were often off by factors of 2-3. This is partly due to the highly distorted nature of the predominantly used mapping projections (such as *Mercator*).

A particularly extreme example is the worldwide misjudgement of the true size of *Africa*. This single image tries to embody the massive scale, which is larger than the *USA, China, India, Japan* and *all of Europe..... combined!*



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Important new information available for:

- biodiversity value
- probability of success
- cost



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Factoring species, non-species values and threats into biodiversity prioritisation across the ecoregions of Africa and its islands

Neil D. Burgess^{a,b,*}, Jennifer D'Amico Hales^a, Taylor H. Ricketts^a, Eric Dinerstein^a

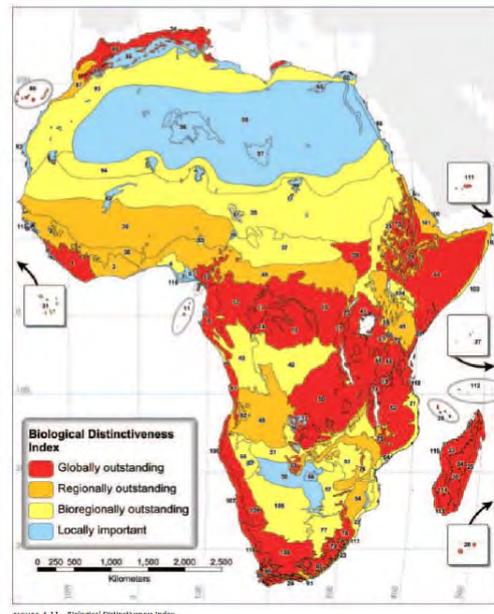
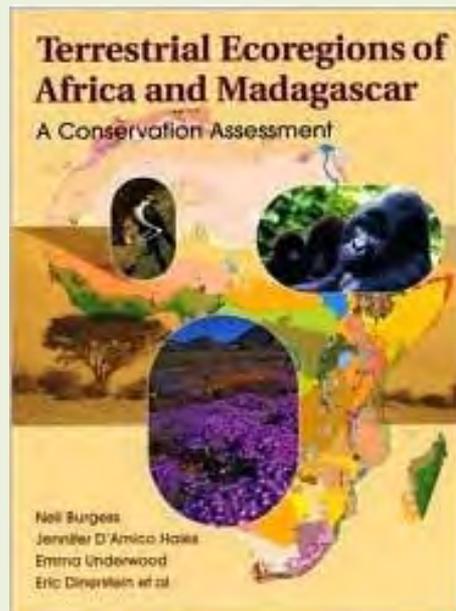
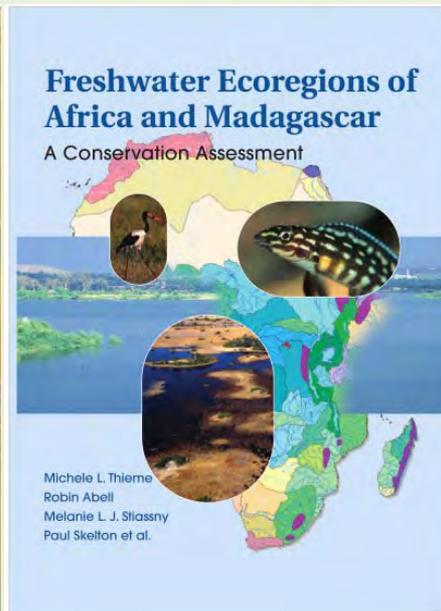


FIGURE 4.11. Biological Distinctiveness Index.

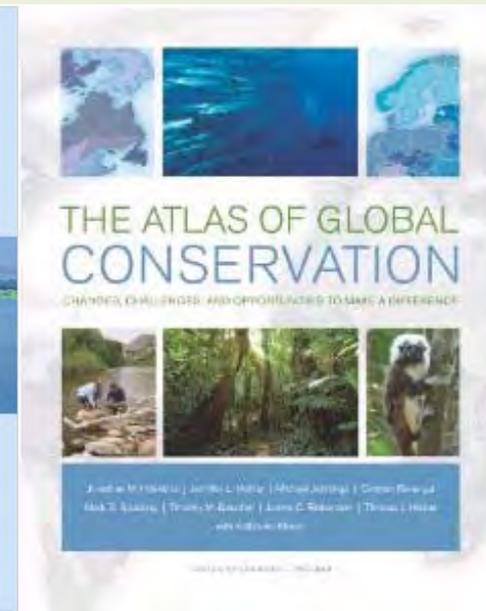
Biodiversity Return Data



Terrestrial



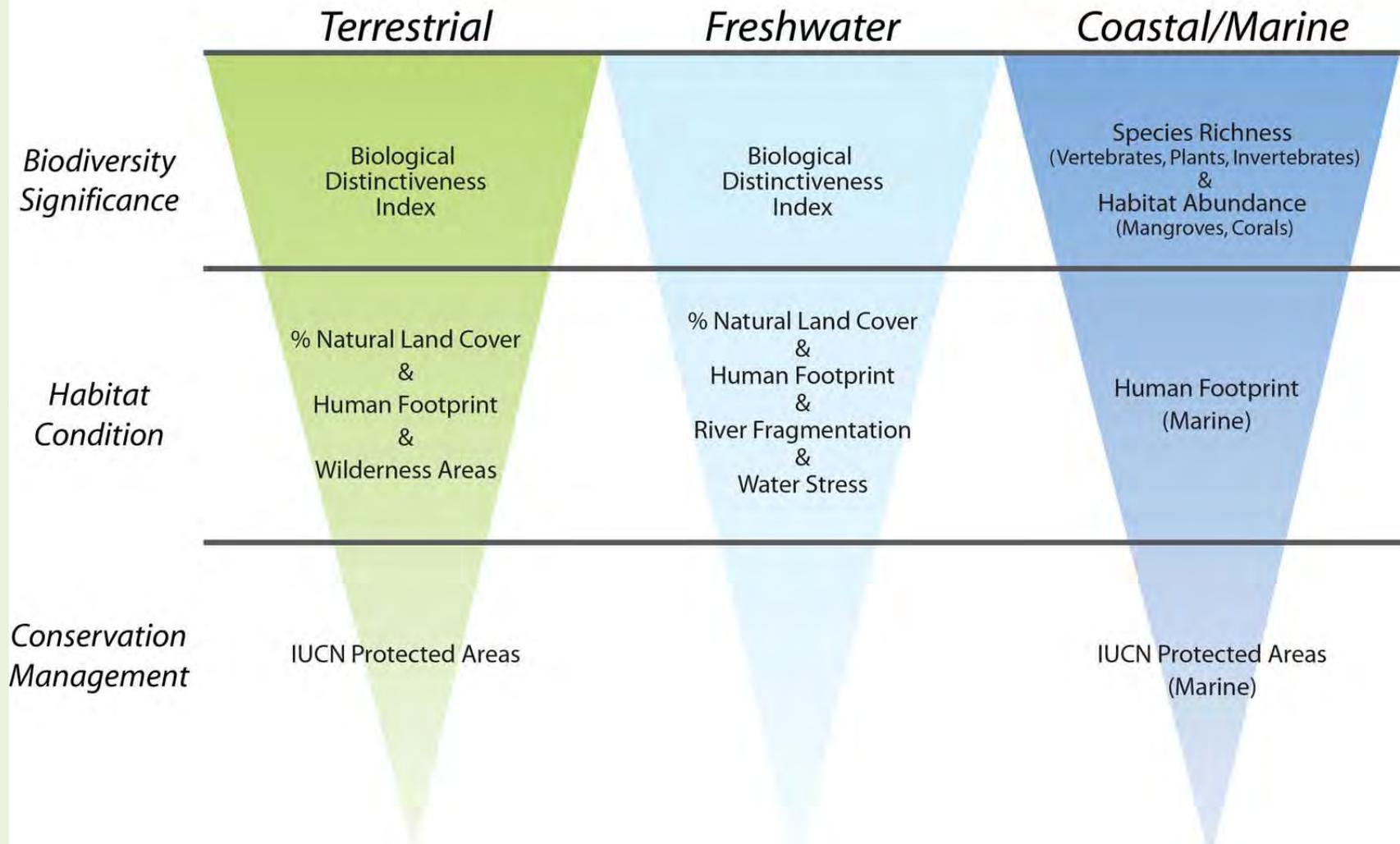
Freshwater



Marine

$$\text{ROI per country} = \frac{\text{Biodiversity Return} * \text{Probability of Success}}{\text{Cost}}$$

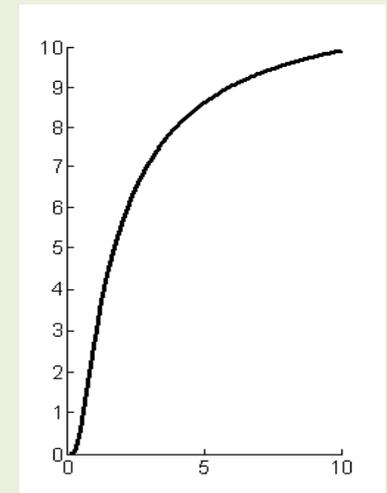
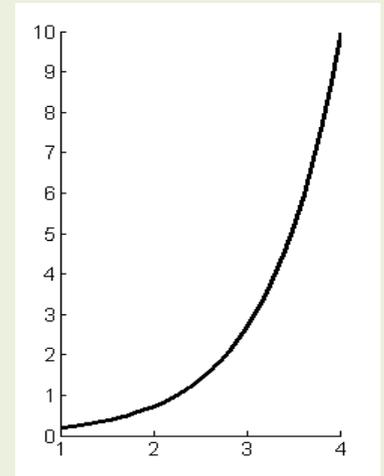
Datasets Used in Priority Setting



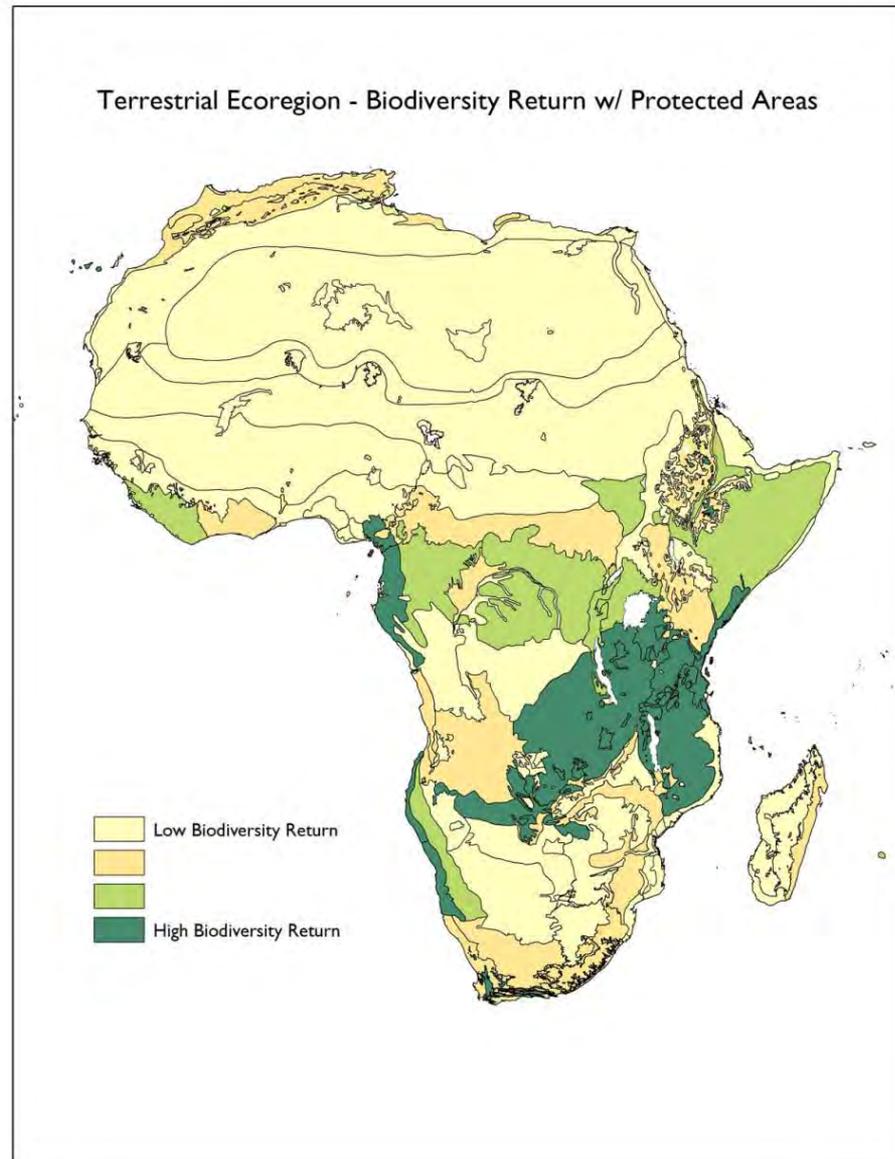
$$\text{ROI per country} = \frac{\text{Biodiversity Return} * \text{Probability of Success}}{\text{Cost}}$$

Terrestrial Biodiversity Return per Ecoregion =

1. *Biological Distinctiveness Index X*
2. *% Natural landcover remaining X*
3. *Level of fragmentation X*
4. *Protected Area Extent*



Terrestrial Biodiversity Return

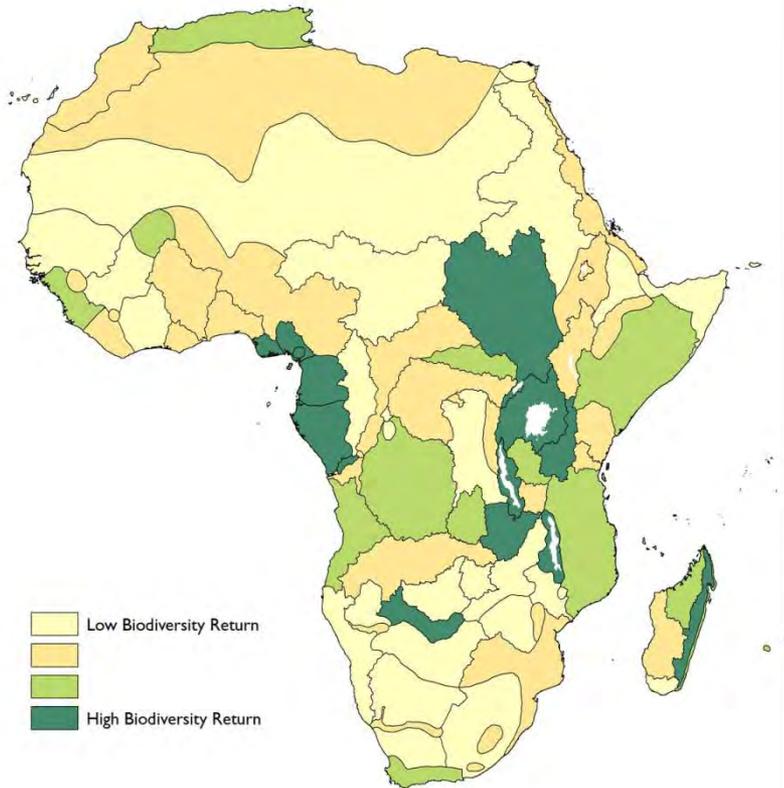


Biodiversity Return

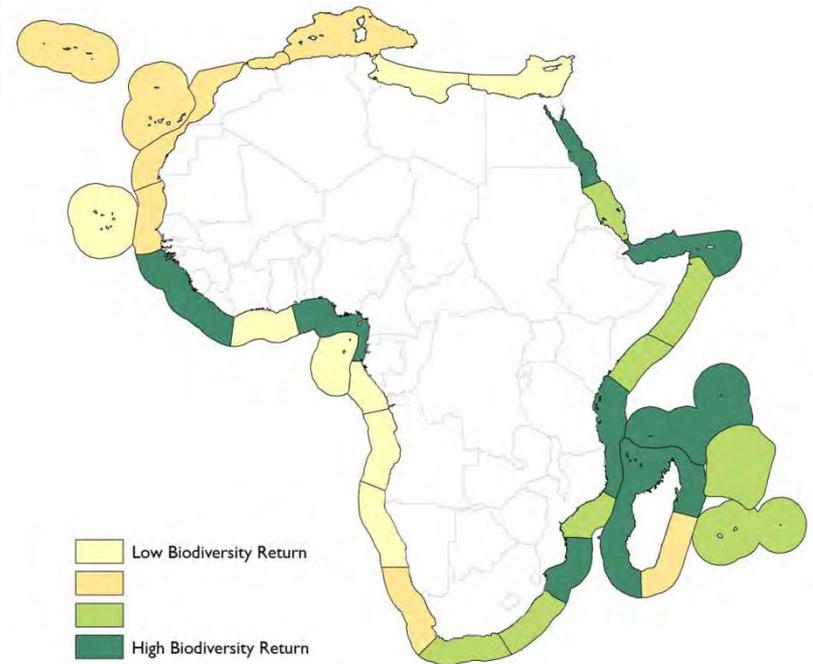
Freshwater

Marine

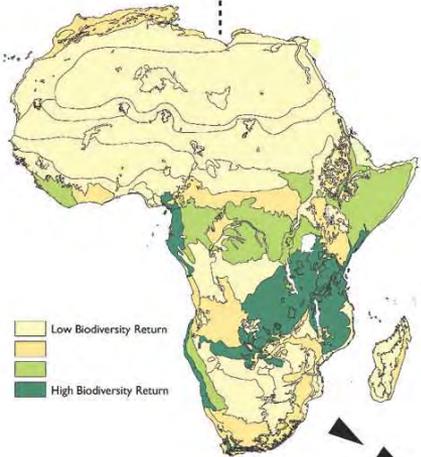
Freshwater Ecoregions - Biodiversity Return w/o Protected Areas



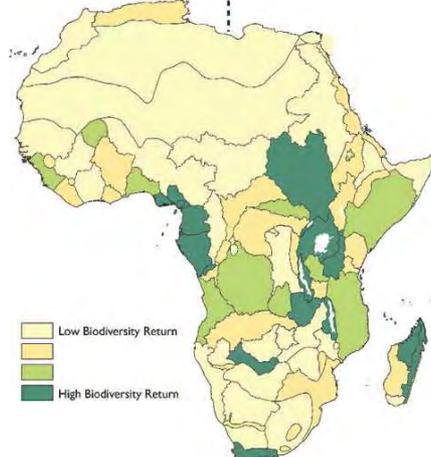
Marine Ecoregions - Biodiversity Return w/ Protected Areas



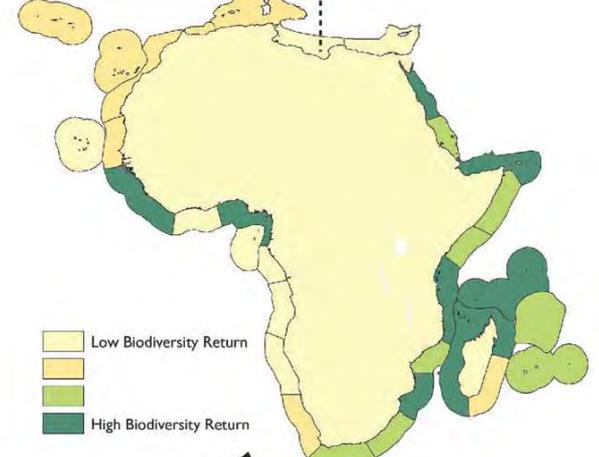
Terrestrial Ecoregions



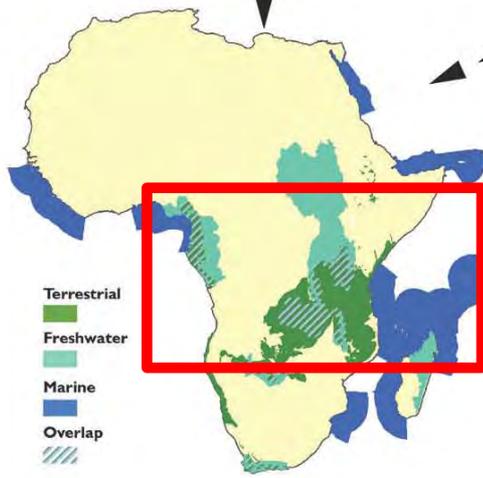
Freshwater Ecoregions



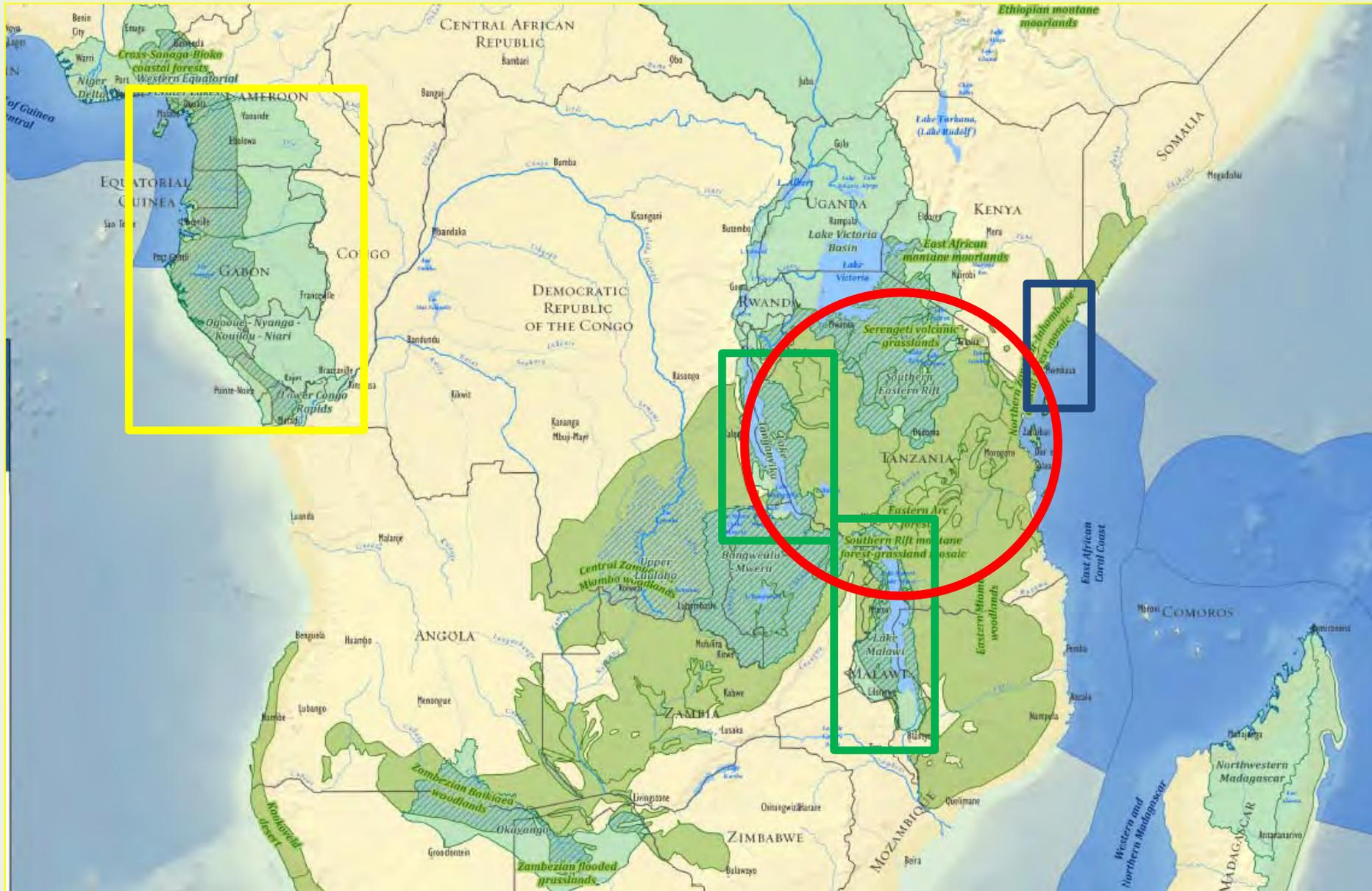
Coastal/Marine Ecoregions



Areas where ecoregional priorities overlap are higher priorities



Overlapping Ecoregional Priorities



Probability of Success



ABOUT THE IBRAHIM PRIZE THE IBRAHIM INDEX SCHOLARSHIPS WORKING WITH CIVIL SOCIETY MEDIA CENTRE

[Capacity Development & Project Team] [Methodology]

The Ibrahim Index

HOME / THE IBRAHIM INDEX

This is the second edition of the 2010 Ibrahim Index published in October 2010.

[Excel | 2010 edition of the Ibrahim Index of African Governance - download full data set](#)

[Zipped file | 2010 edition of the Ibrahim Index - download full dataset](#)

The Ibrahim Index:

Measures the delivery of public goods and services to citizens by government and nonstate actors
Uses indicators across four main categories: Safety and Rule of Law; Participation and Human Rights; Sustainable Economic Opportunity; and Human Development as proxies for the quality of the processes and outcomes of governance
Is the most comprehensive collection of qualitative and quantitative data that assess governance in Africa
Is funded and led by an African institution
Is a progressive and consultative assessment of governance

The Ibrahim Index aims to:

be Africa's leading assessment of governance that is a tool for citizens, public authorities and partners to assess progress
stimulate constructive debate on governance
establish a framework for assessing governance in Africa that is focused on government delivery

Index Indicators

Safety and Rule of Law
Participation and Human Rights
Sustainable Economic Opportunity
Human Development

Index Sources

Bertelsmann Foundation | Bertelsmann Transformation Index (BTI)
International Bank for Reconstruction and Development, The World Bank | International Development Association (IDA) Resource Allocation Index (WB)
International Bank for Reconstruction and Development, The World Bank (WB) | Bulletin Board on Statistical Capacity (BBSC)
Joint United Nations Programme on HIV/AIDS (UNAIDS) | UNAIDS Knowledge Centre

$$\text{ROI per country} = \frac{\text{Biodiversity Return} * \text{Probability of Success}}{\text{Cost}}$$

2010
*Ibrahim Index
of African
Governance*

a) Human Development



b) Participation and Human Rights



Legend for Maps



c) Safety and Rule of Law



d) Sustainable Economic Opportunity



e) Overall Ranking





Available online at www.sciencedirect.com



Biological Conservation 117 (2004) 343–350

www.elsevier.com/locate/biocon

BIOLOGICAL
CONSERVATION

Integrating costs into conservation planning across Africa.

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Cost Data

Protected Area Management

The worldwide costs of marine protected areas

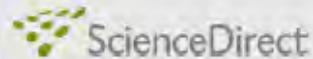
Andrew Balmford^{*†}, Pippa Gravestock[‡], Neal Hockley^{*§}, Colin J. McClean[¶], and Callum M. Roberts[¶]

BIOLOGICAL CONSERVATION 140 (2007) 40–49



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Global-scale mapping of economic benefits from agricultural lands: Implications for conservation priorities

Robin Naidoo^{a,*}, Takuya Iwamura^{b,1}

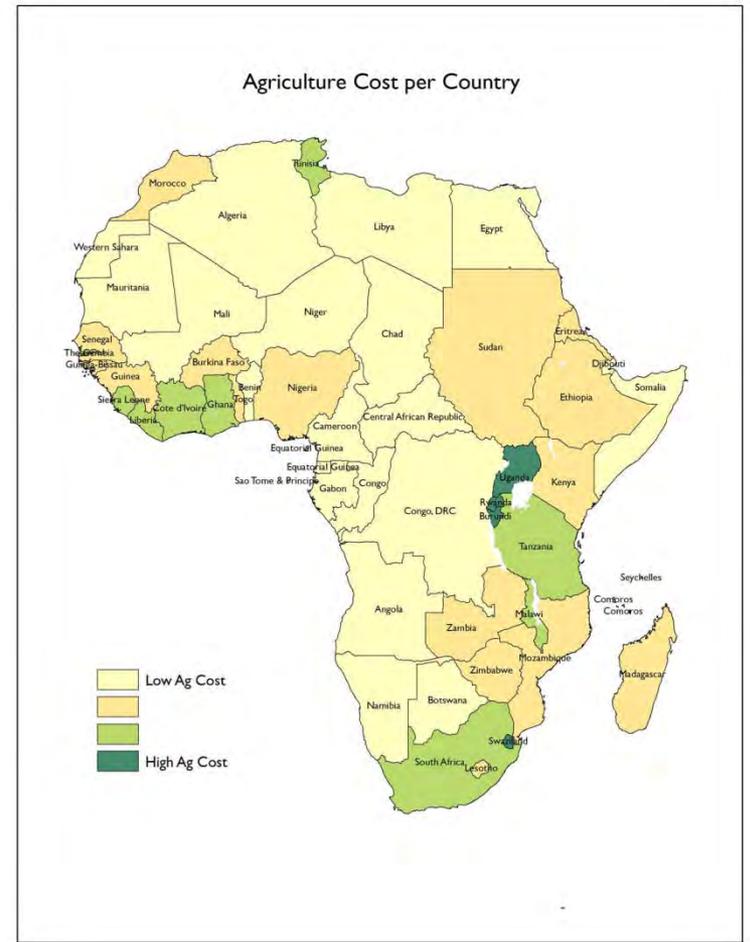
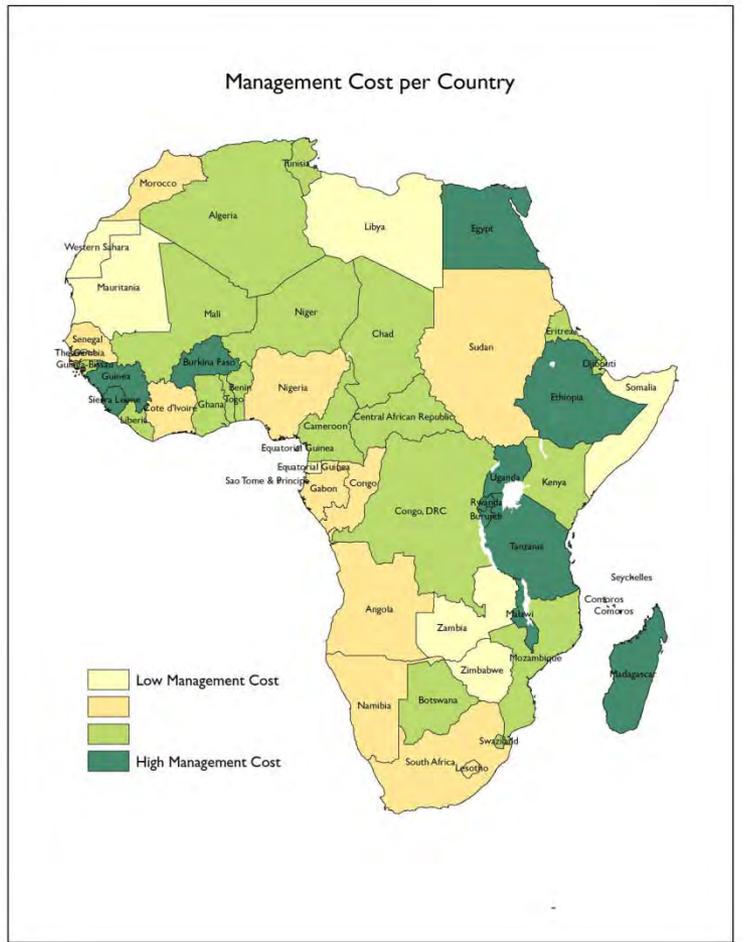
Agricultural Lands –
Outside protected areas
Opportunity Cost

$$\text{ROI per country} = \text{Biodiversity Return} * \text{Probability of Success}$$

Cost

Management Cost

Opportunity Cost



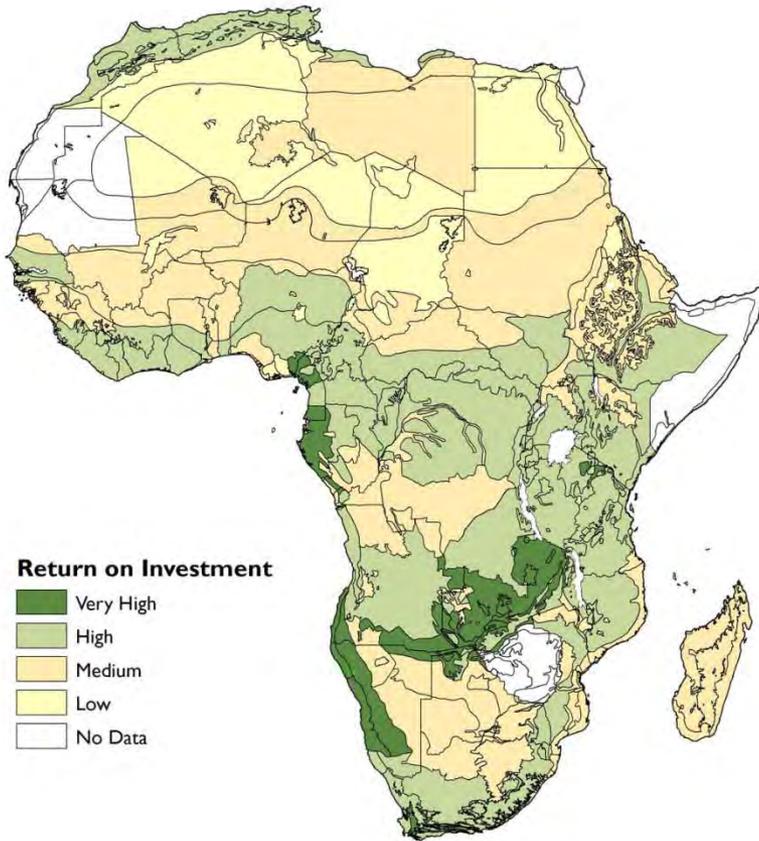
Protected area management costs per SqKm

Expected agricultural value per ha

$$\text{ROI} = \frac{\text{Biodiversity Return} * \text{Probability of Success}}{\text{Cost}}$$

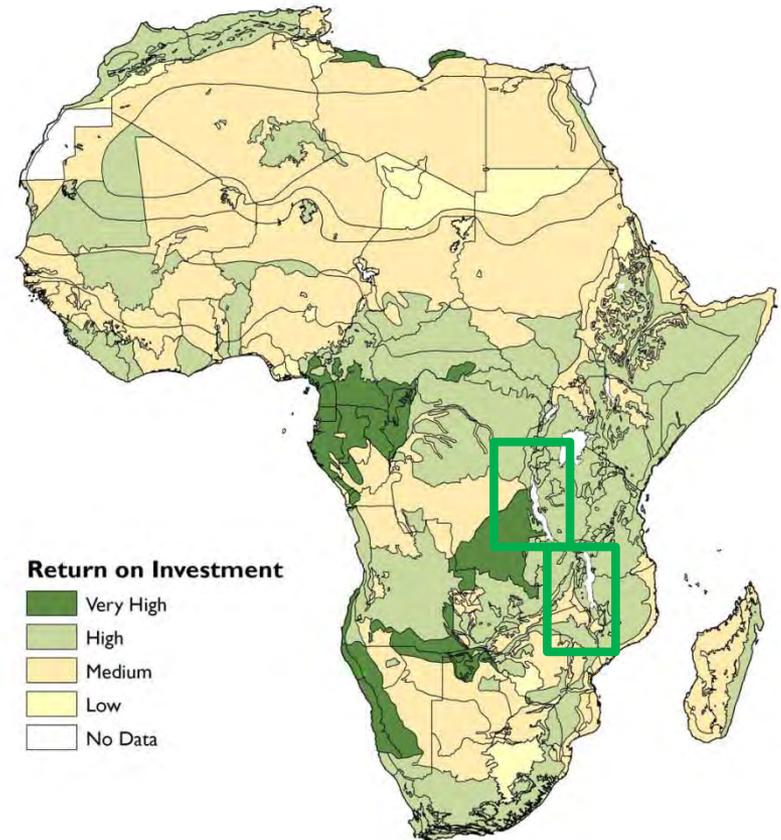
Terrestrial ROI – per ecoregion segment

Terrestrial ROI - w/ Management Costs



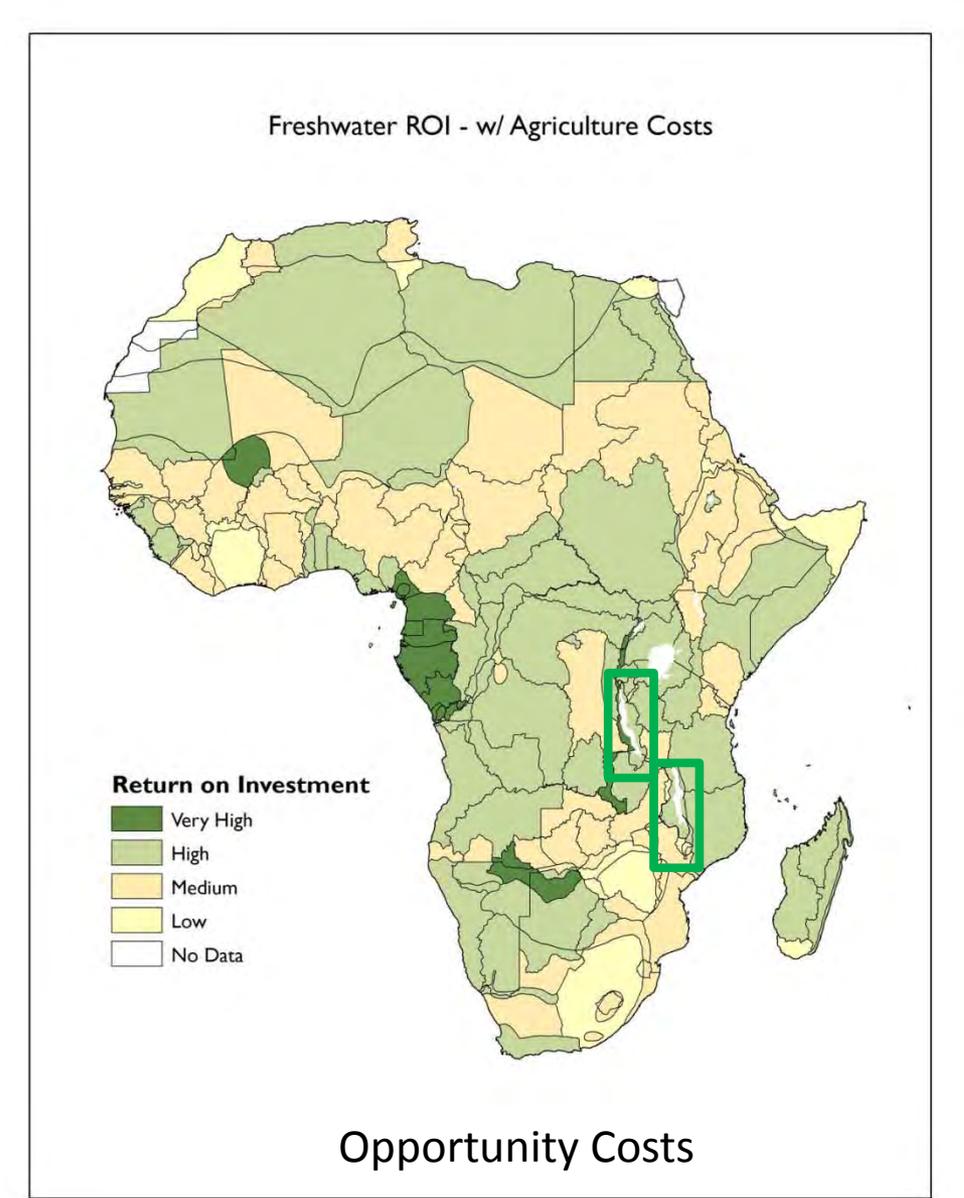
Inside Protected Areas

Terrestrial ROI - w/ Agriculture Costs

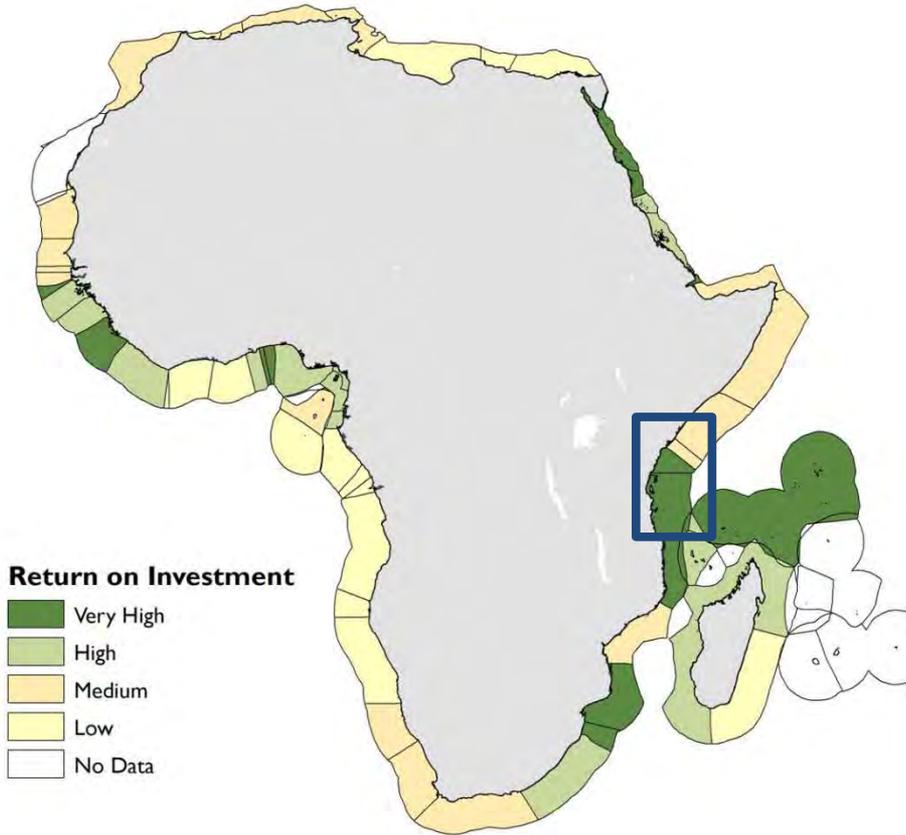


Outside Protected Areas

Freshwater ROI – per ecoregion segment



Marine ROI w/ Protected Areas - w/MPA Costs



Marine ROI –
by ecoregion

Terrestrial ROI - w/ Agriculture Costs

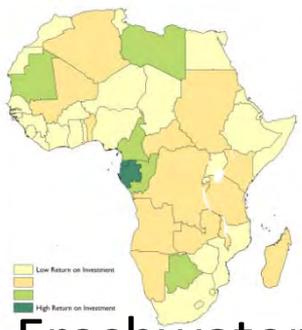


Terrestrial

What is new:

- Updated and **New** information
- Created comprehensive set of Terrestrial, Freshwater, **and Marine Priority Ecoregions**
- Incorporated **cost data** into prioritization process
- Explicitly factored in **socio-economic data** to represent probability of success
- Created **easily updatable ROI** assessments for all Africa continental countries.

Freshwater ROI w/o Protected Areas - w/Agriculture Costs



Freshwater

Marine ROI w/MPA Costs



Marine

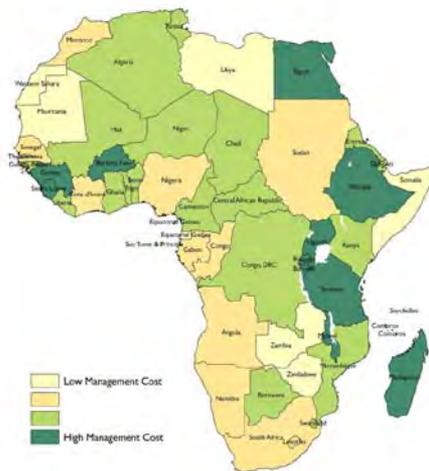
c) Safety and Rule of Law



Potential Uses:

- Decision Support
- Strategy Development
- Issue Specific ROI

Management Cost per Country



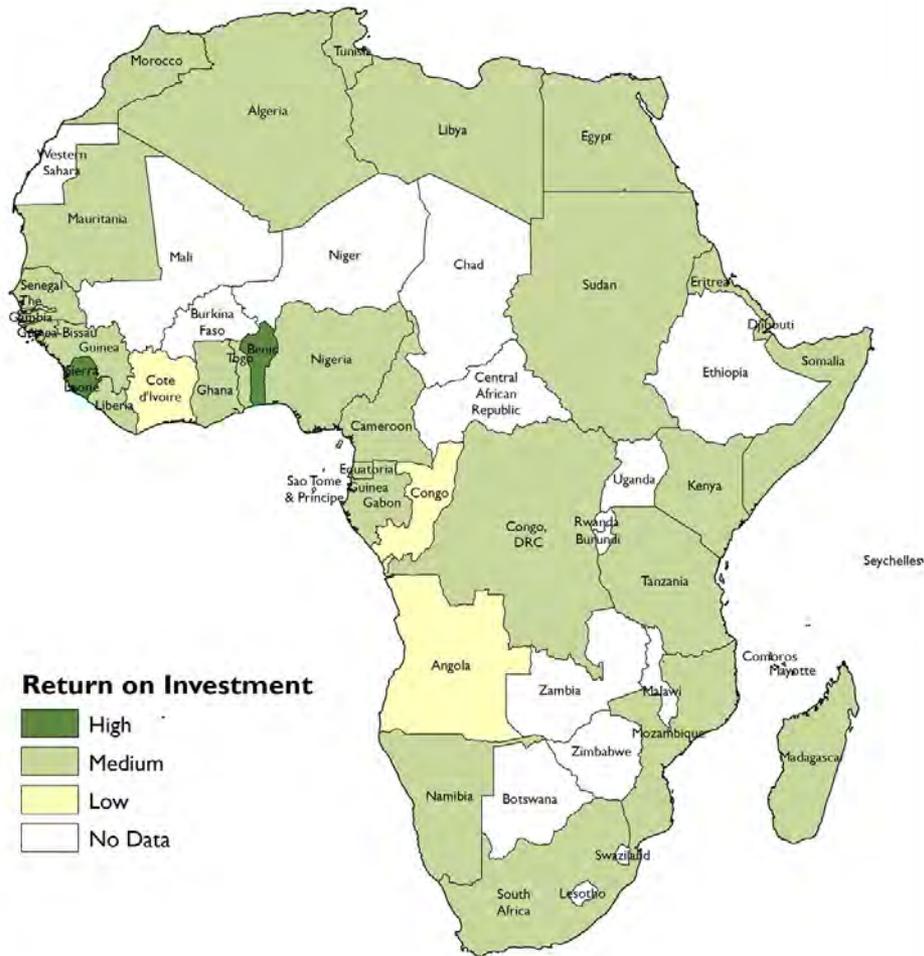
Future Research Needs:

- Critical role of cost data
- Need new data for application of ROI at different scales
e.g., within priority ecoregions

THANK YOU

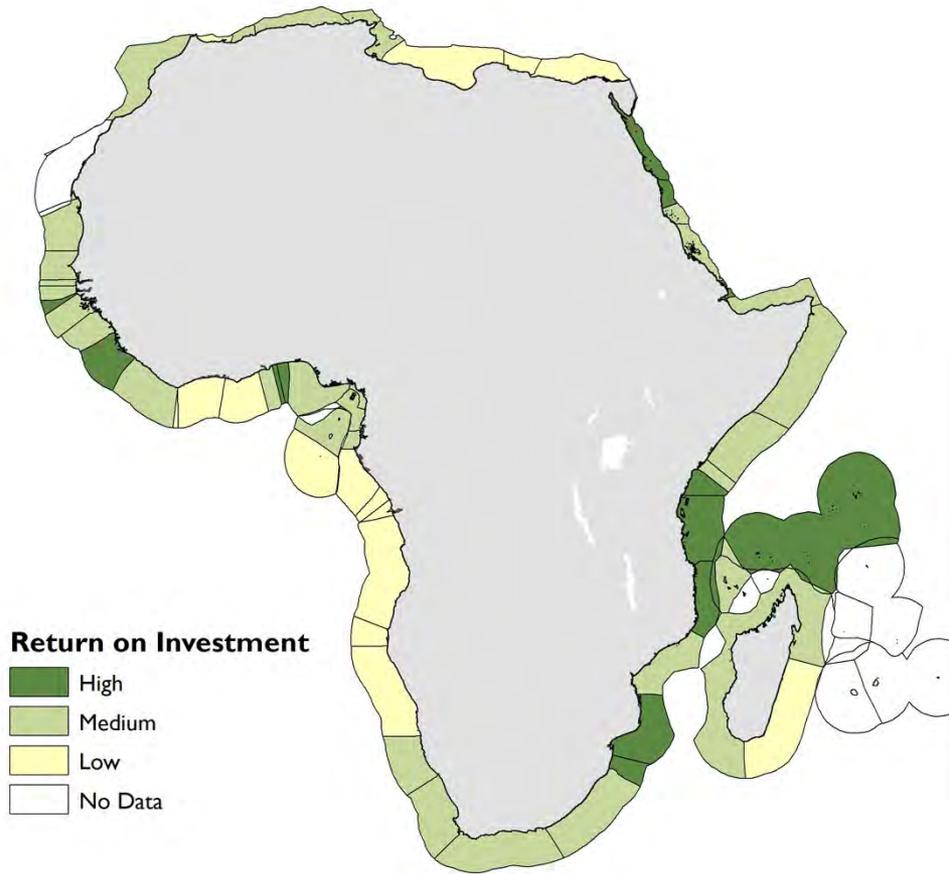
Tim Tear, Brad Stratton, Eddie Game,
Matt Brown and Rebecca Shirer

Marine ROI w/o Protected Areas - w/MPA Costs



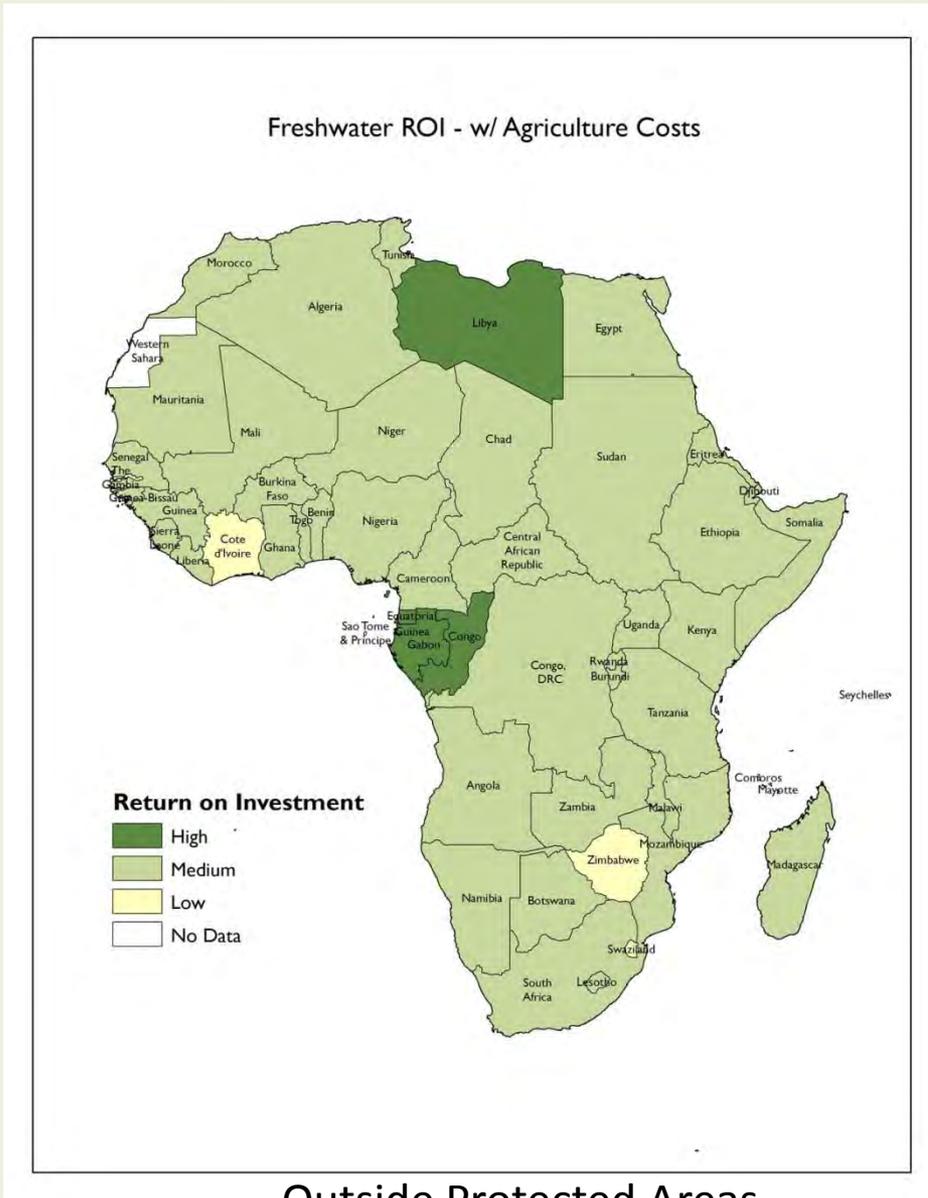
Marine ROI

Marine ROI w/o Protected Areas - w/MPA Costs



Marine ROI

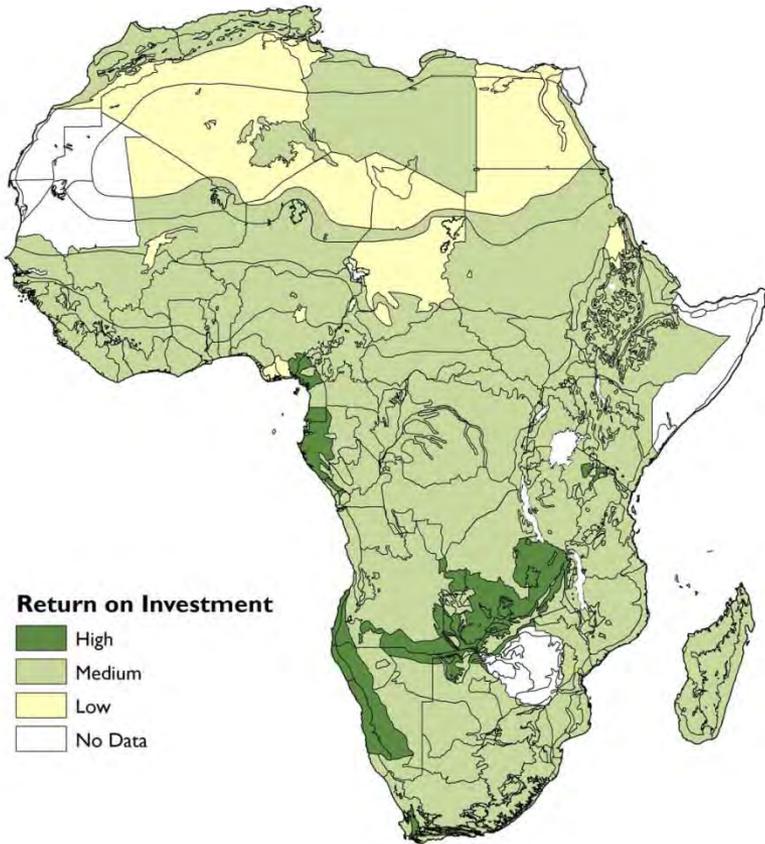
Freshwater ROI



Outside Protected Areas

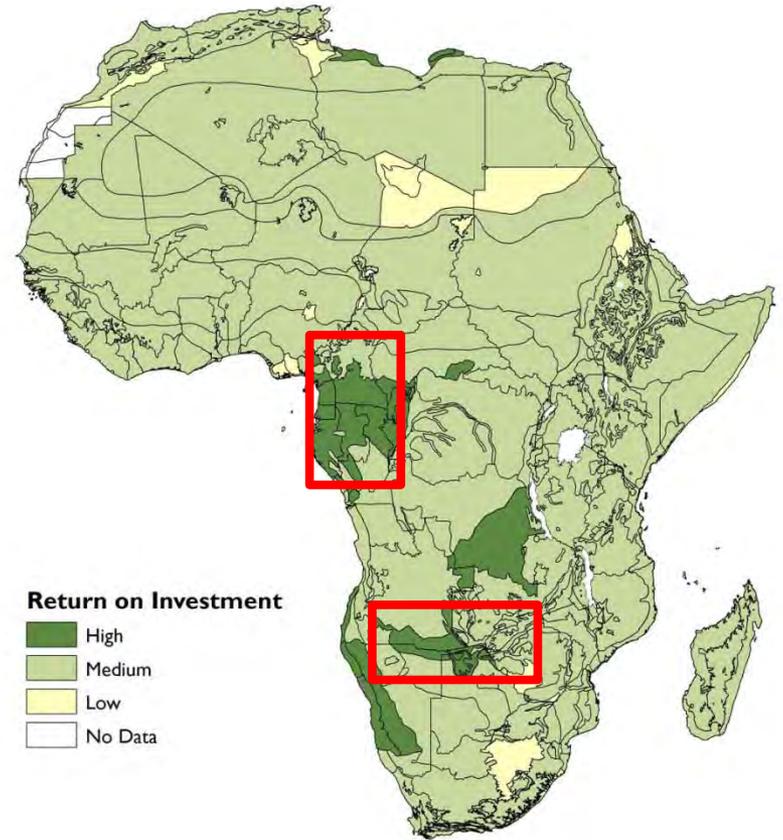
Terrestrial ROI

Terrestrial ROI - w/ Management Costs



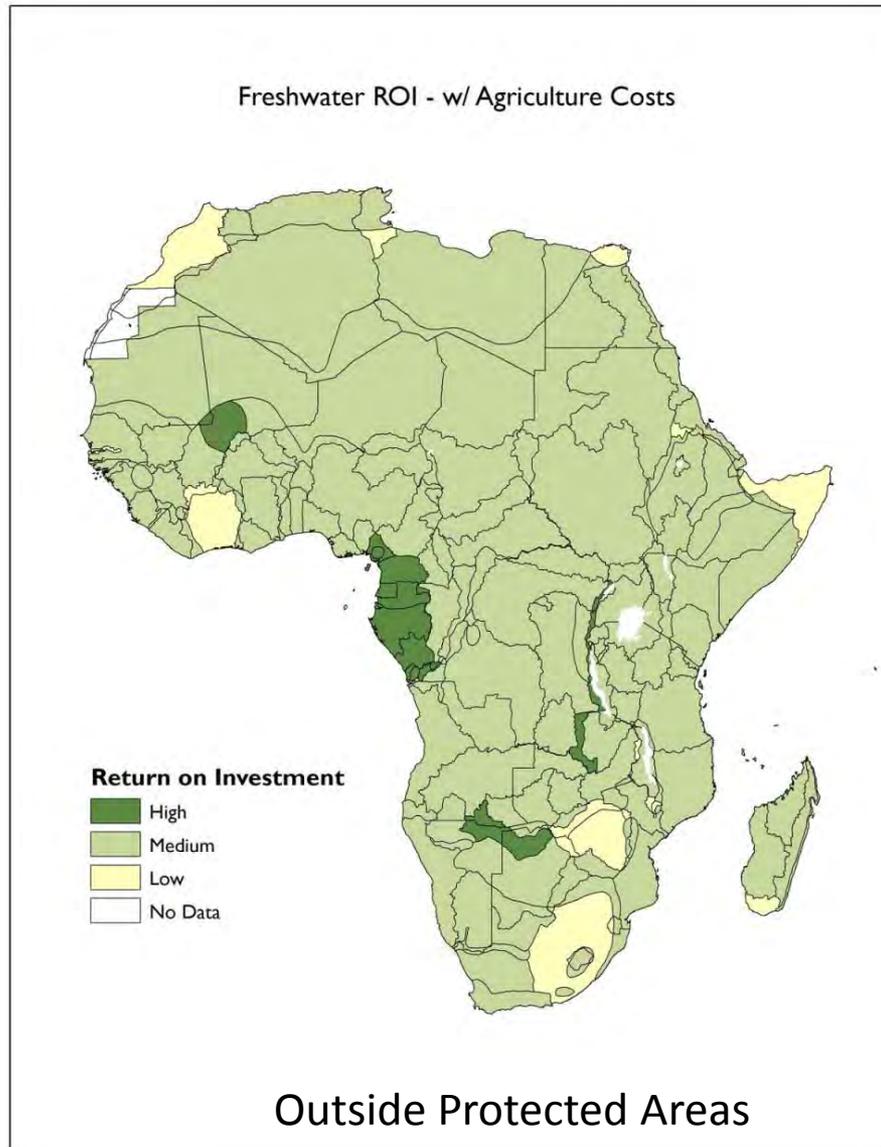
Inside Protected Areas

Terrestrial ROI - w/ Agriculture Costs



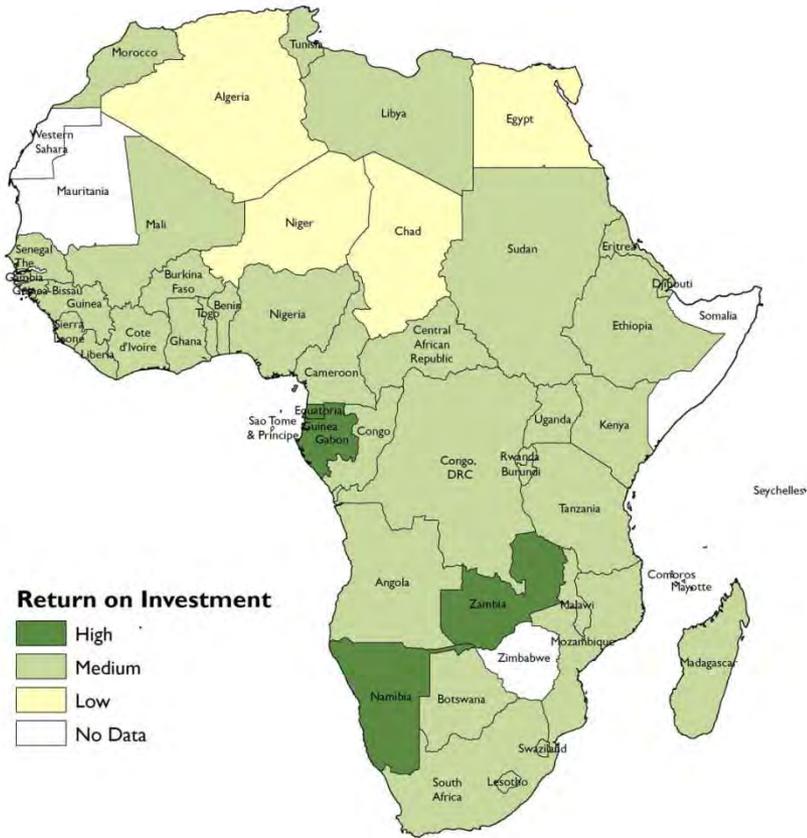
Outside Protected Areas

Freshwater ROI



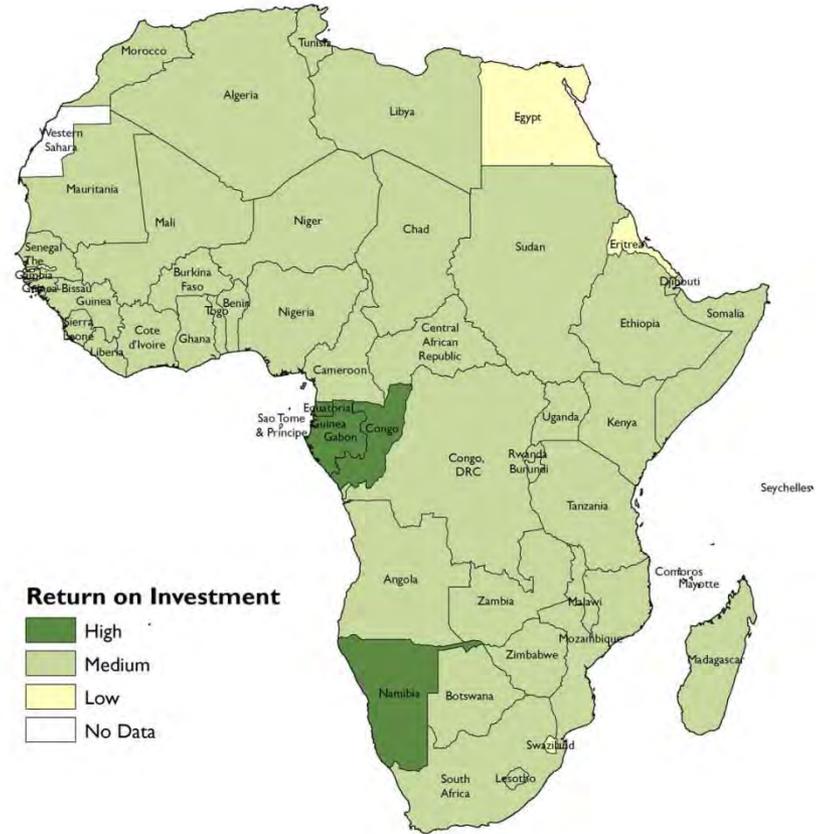
Terrestrial ROI

Terrestrial ROI - w/ Management Costs



Inside Protected Areas

Terrestrial ROI - w/ Agriculture Costs

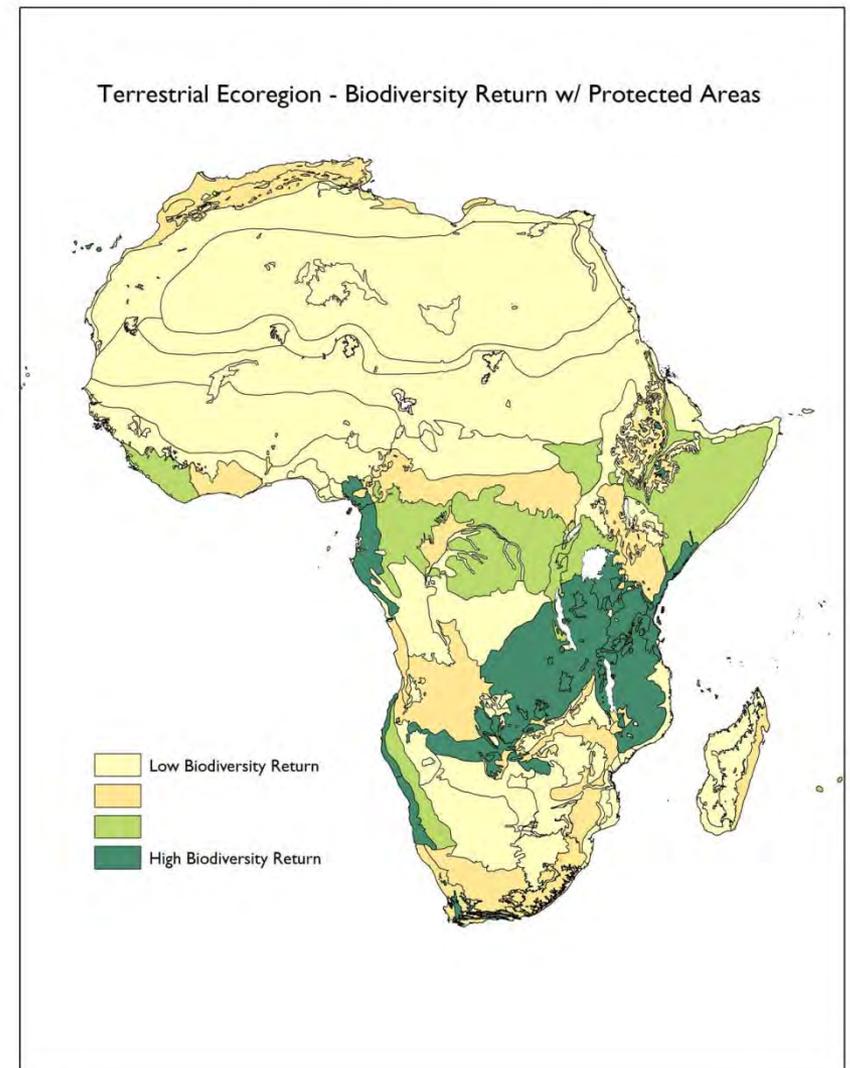
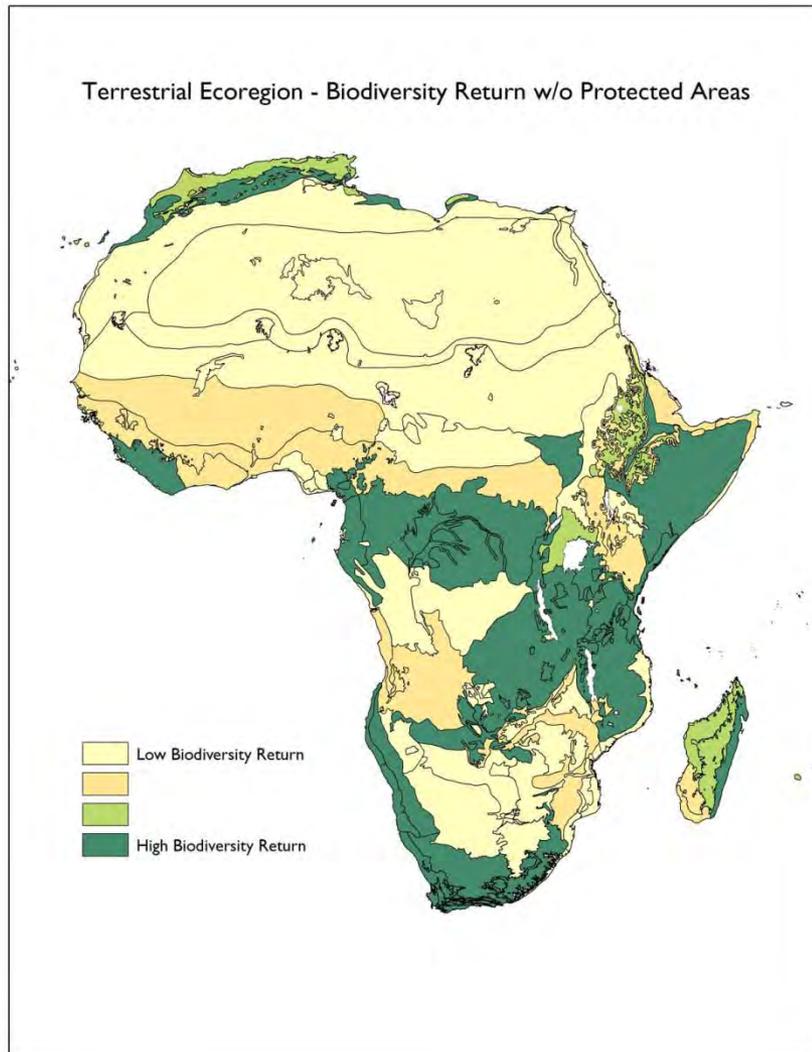


Outside Protected Areas

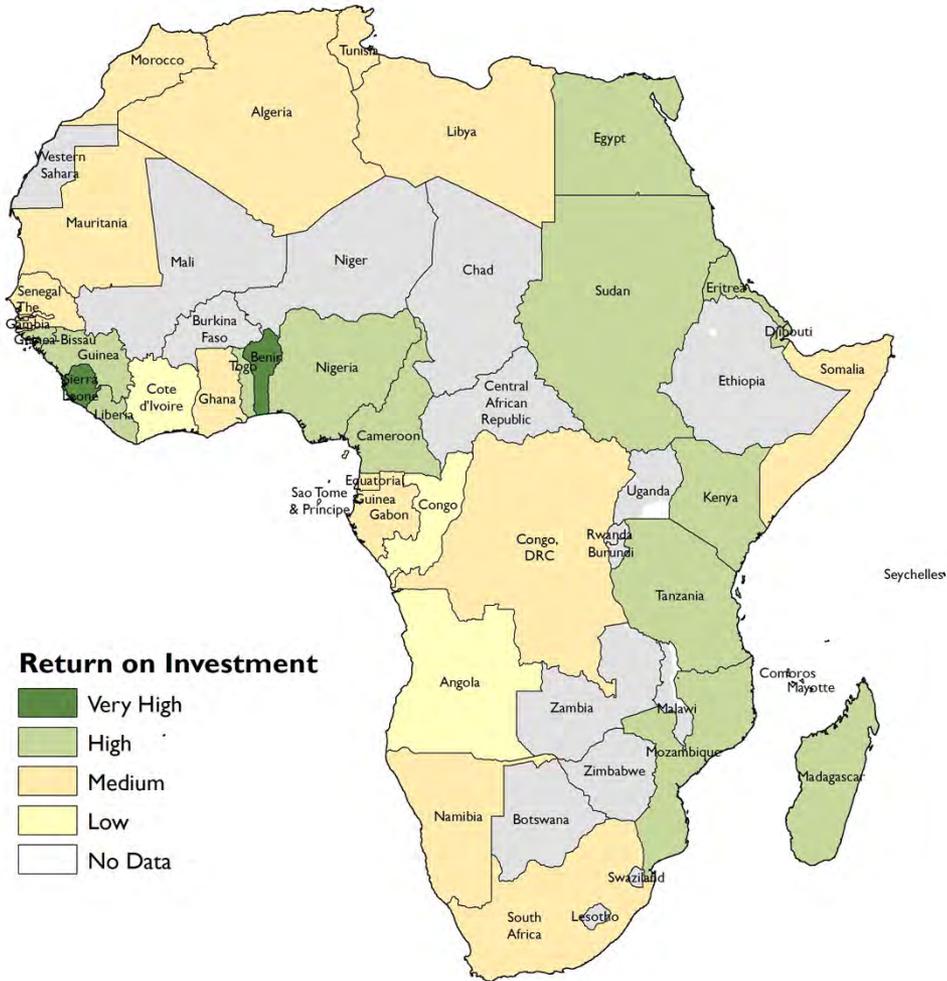
Terrestrial Biodiversity Return

Without Protected Areas

With Protected Areas



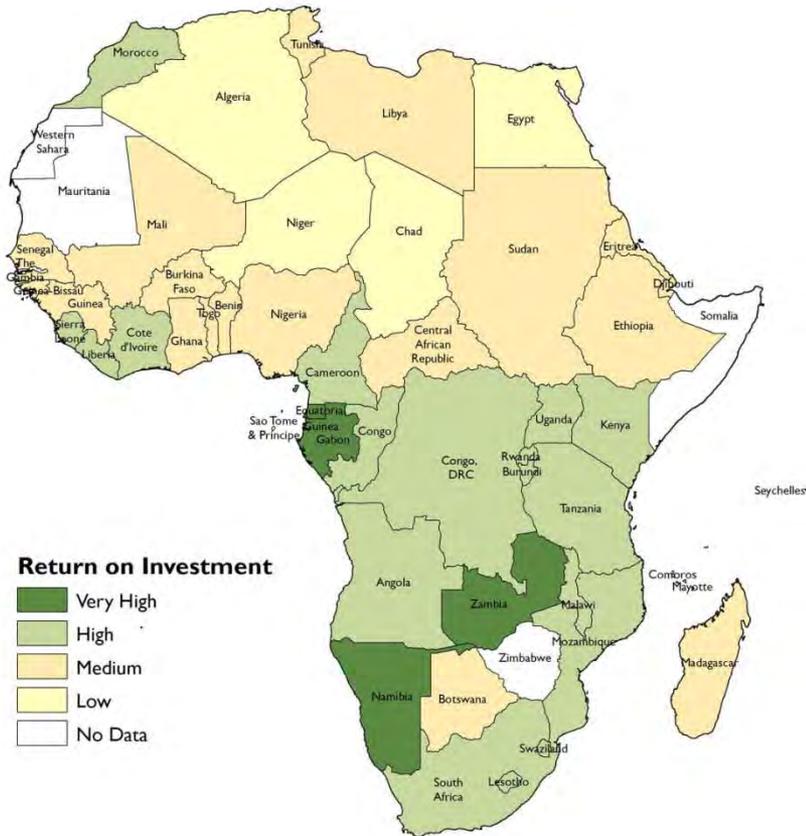
Marine ROI w/ Protected Areas - w/MPA Costs



Marine ROI – by country

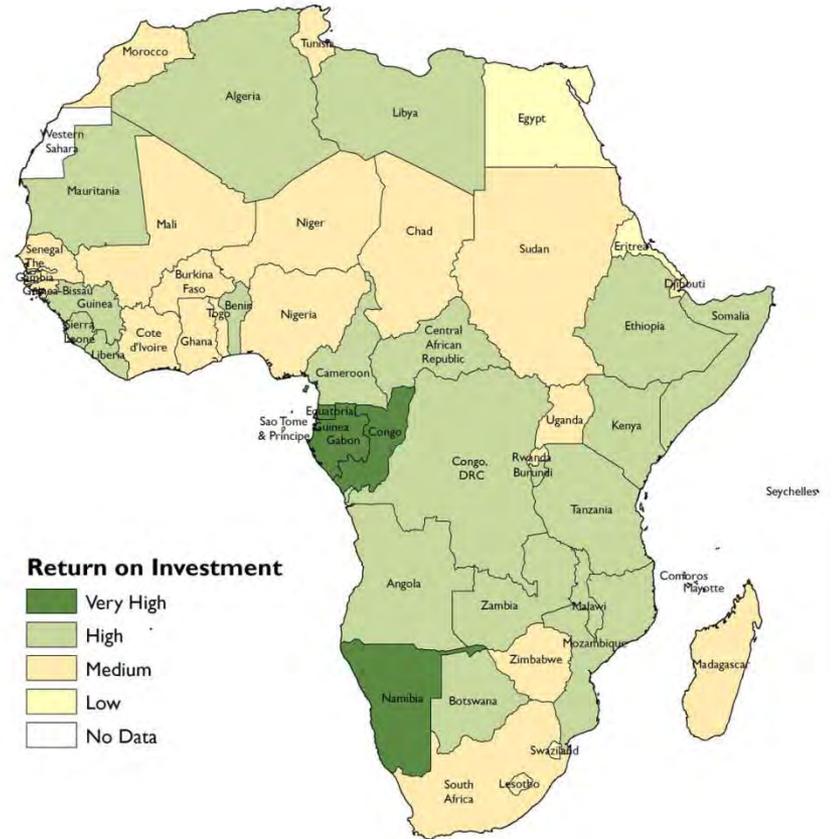
Terrestrial ROI – per country

Terrestrial ROI - w/ Management Costs



Inside Protected Areas

Terrestrial ROI - w/ Agriculture Costs



Outside Protected Areas

Using Return-on-Investment To Identify Conservation Priorities in Africa

Tim Tear, Brad Stratton, Eddie Game, Matt Brown and Rebecca Shirer