An assessment of anthropogenic instream structures on fish assemblages in the uMkhomazi River, South Africa

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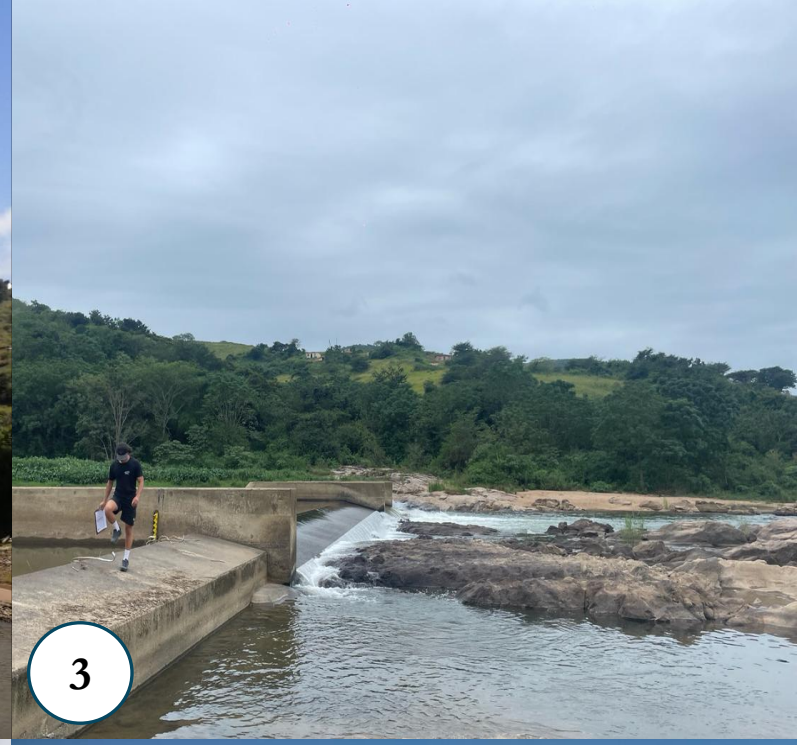
Introduction

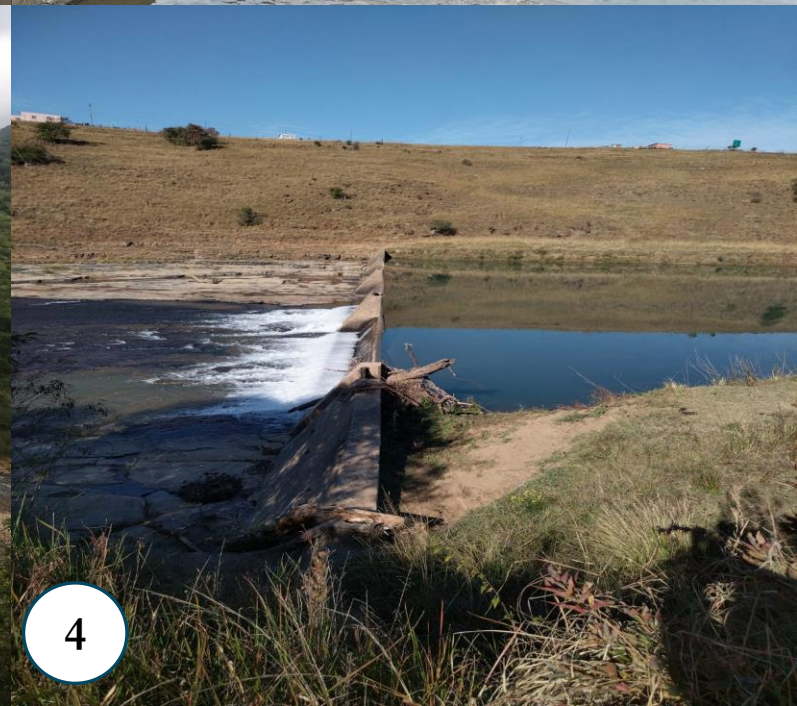
1. Instream barrier types:

- Weirs
- Dams
- Culverts

Used for hydropower, roads, and water security infrastructure

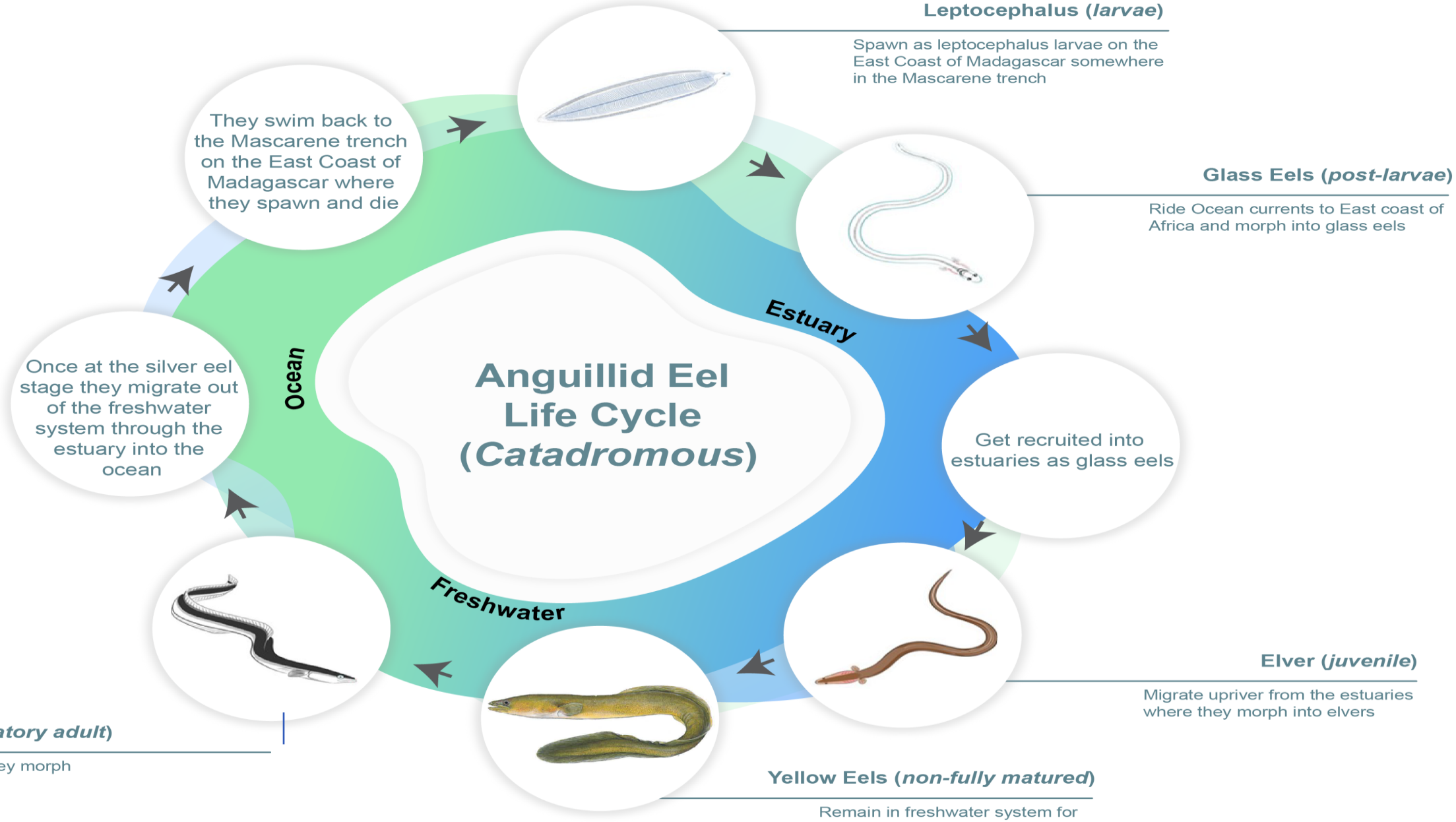
2. Limits the movement of aquatic organisms





Introduction

1. Barriers may have adverse effects on diadromous species
2. May inhibit their life cycle



Adapted from Cresci et al. (2020) & Skelton(2001)

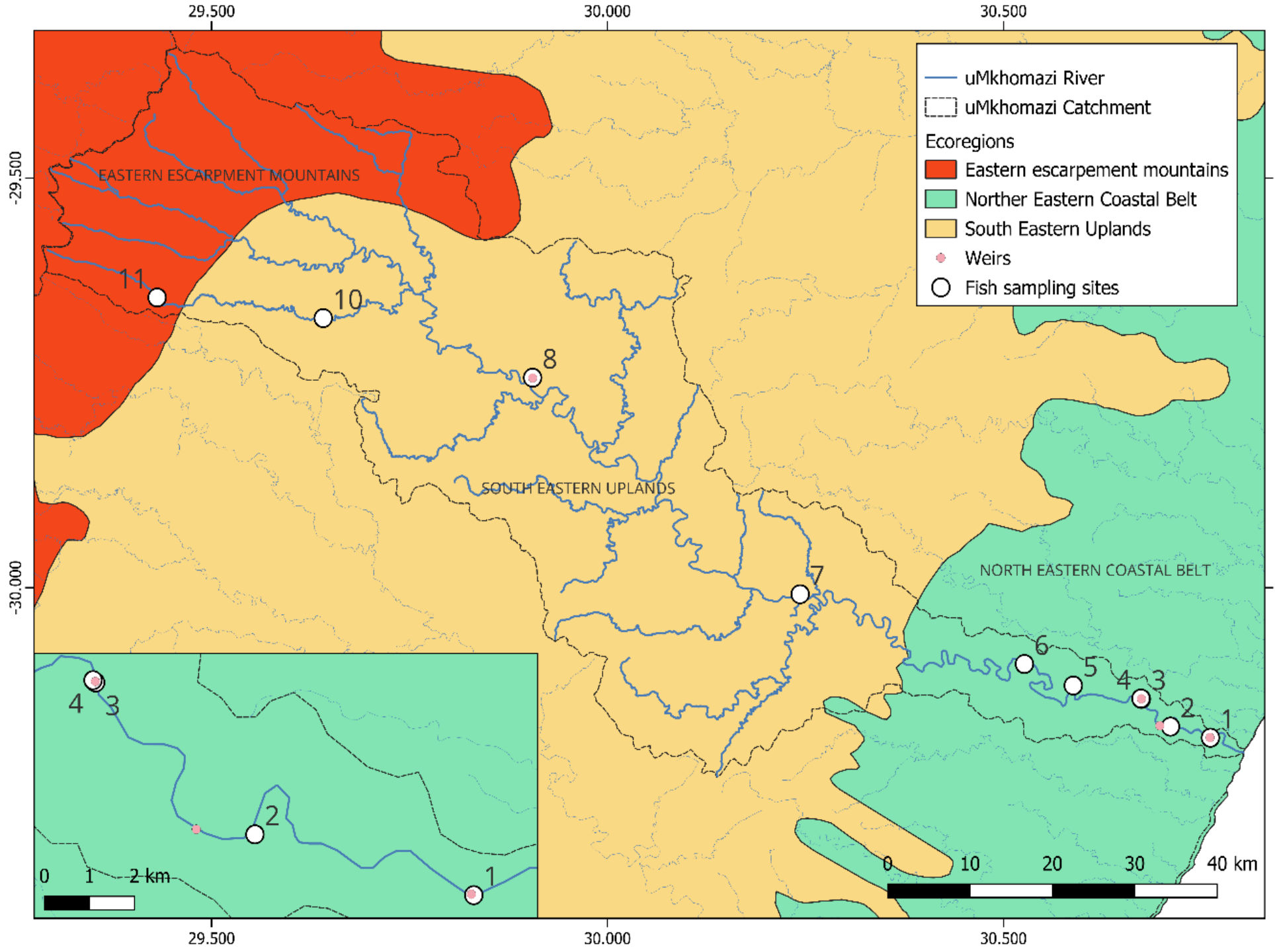
Introduction

1. Barriers require adequate fishways
   - Should allow movement up and downstream
   - Useless if fishways are unidirectional

Introduction

- Aim to assess degree of connectivity within uMkhomazi River, KwaZulu-Natal

- Anguillid eels are good indicators of connectivity


29.500
30.000
30.500
-29.500
-30.000
uMkhomazi River
uMkhomazi Catchment
Ecoregions
Eastern escarpement mountains
Norther Eastern Coastal Belt
South Eastern Uplands
Weirs
Fish sampling sites
EASTERN ESCARPMENT MOUNTAINS
SOUTH EASTERN UPLANDS
NORTH EASTERN COASTAL BELT
11
10
8
7
6
5
4
3
2
1
0 10 20 30 40 km
0 1 2 km

Study sites

Methods

1. 10 biotopes per site
2. 1 biotope = 1 effort
3. Electro-shocker used to collect samples
4. Collect organisms using a net and place into a bucket at each effort

Methods

1. Record abundances
2. Species richness
3. Morphological measurements
4. Habitat data
   - Depth, flow, substrate, cover features
5. Water quality

Results

Presence/absence of the different species caught at each site

Species	Sample site									
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10
River fragment	A	B	C	D	D	D	D	D	E	E
Awaous aeneofuscus	5					2				
Labeobarbus natalensis	2	23	66		23	162	39	8		
Anguilla marmorata	1		2			6	3			
Anguilla mossambica	1		1			2				
Lutjanus argentimaculatus	1									
Neoscorpis lithophilus	2									
Gilchristella aestuaria	1									
Oreochromis mossambicus			3		4	2				
Amphillus natalensis						4	4		7	
Clarias gariepinus						2				
Oncorhynchus mykiss										2
Leiognathus equula	1									
Enteromius viviparus			11			13		3		

Discussion

- Suggest degree of connectivity exists
- Suitable fishways to be retrofitted
- Proposed dams and weirs for the system will most likely have adverse effects

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Ford WILDLIFE FOUNDATION

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