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National Strategic Environmental Assessment for Aquaculture Development in South Africa

2nd Expert Reference Group Meeting

22 November 2016

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Agenda

TIME	ACTIVITY/PRESENTATION	PRESENTER
12:30 - 13:00	Registration with lunch	
13:00 - 13:10	Welcome and introductions	DAFF: Zimasa Jika
13:10 – 13:45	Overview of Aquaculture SEA – approach, impacts, objectives, scope & key outputs	CSIR: Lizande Kellerman
13:45 – 14:45	Feedback on completion of the Inception Phase (stakeholder engagement, focus group meetings roadshow, literature review and baseline information, key impacts identified and review of scope of SEA)	CSIR: Lizande Kellerman
14:45 – 15:00	Tea/Coffee break	
15:00 – 15:50	Feedback on Screening Phase progress (data capture & national-scale mapping of existing aquaculture facilities, environmental attributes, siting criteria & identification of areas most suitable for aquaculture) Approach to remainder of Screening phase	CSIR: Luanita Snyman CSIR: Lizande Kellerman
15:50 – 16:00	Way forward & closure	DEA: Simon Moganetsi

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Purpose of the meeting

- Bring new stakeholders up-to-speed on the SEA (this is the second round of PSC and ERG meetings)
- Present outcomes of *Phase 1: Inception*
- Provide feedback from the national roadshow in Sept/Oct 2016
- Present initial progress on *Phase 2: Screening* and confirm way forward for remainder of Phase 2
- Discuss push & pull factors and weighting criteria

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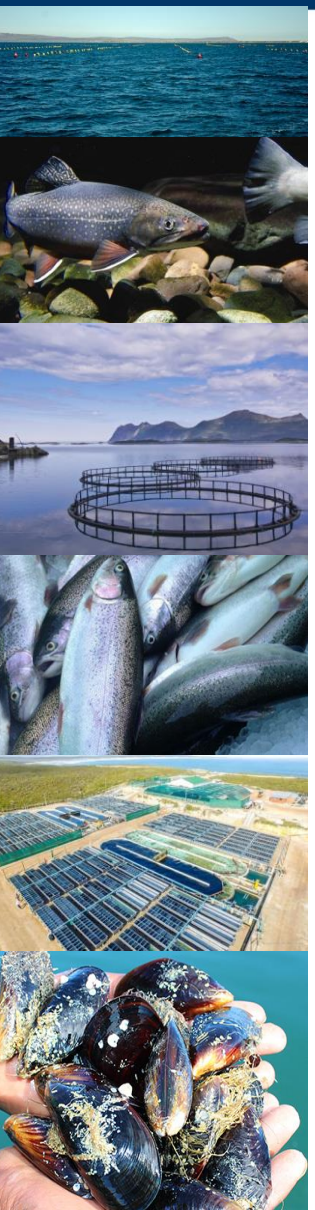
Overview to the Aquaculture SEA



- Aquaculture includes the breeding, rearing and harvesting of plants and animals in salt or fresh water.
- Aquaculture is the fastest growing food production sector in the world.
- An additional 50 million tonnes of fish is required to feed the world population by 2030 - production will come mainly from aquaculture.
- Operation Phakisa, 2014 – promotion of Oceans Economy
  - ✓ Aquaculture is one of the priority focal areas for implementation
- DEA, in collaboration with DAFF has commissioned the CSIR to conduct a Strategic Environmental Assessment (SEA) for aquaculture development in South Africa.
- The overall purpose of the SEA is to **promote** and **support** the responsible **growth** of the aquaculture industry in South Africa.

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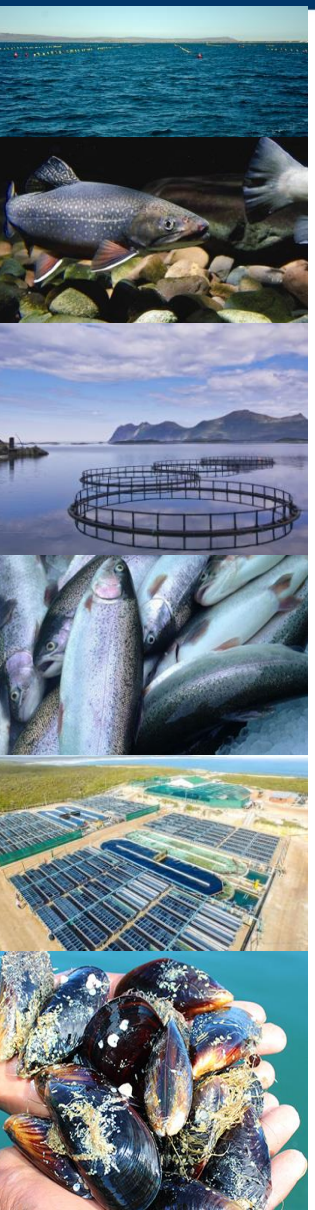
Key challenges of the aquaculture industry in SA



- Over regulation of the sector;
- Market demand favours high-value species more than food supply;
- Scarcity of adequate freshwater and a harsh marine environment;
- Unpredictability associated with climate change;
- Vast difference between winter and summer temperatures;
- Difficulty in accessing project funding;
- Limited pool of skills and support services;
- Challenges with access to sufficient land and sea space; and
- Perceived competition with the tourism and conservation sectors.

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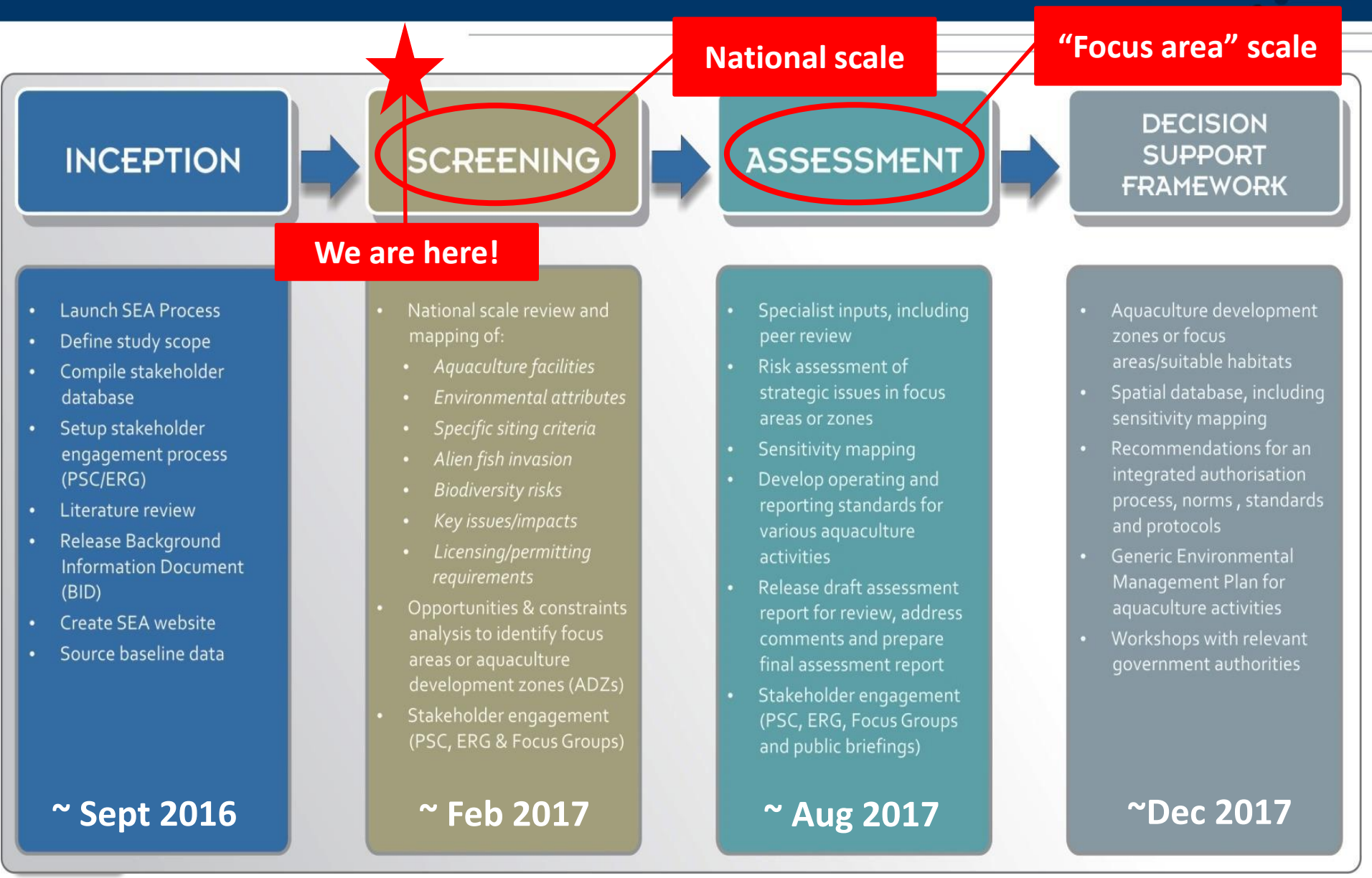
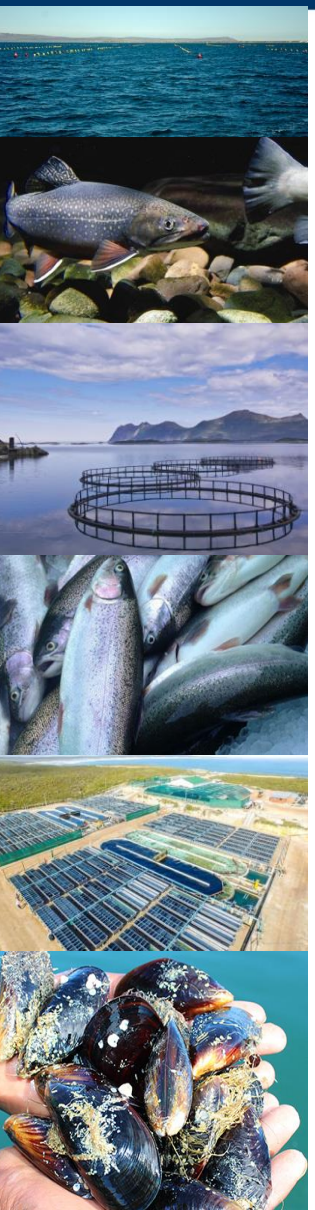
Approach to the Aquaculture SEA



Key objectives of the Aquaculture SEA



- The SEA aims to achieve its purpose in two ways:
  - Firstly, by identifying **suitable areas** where environmentally sustainable aquaculture development can be prioritised and incentivised; and
  - Secondly, by providing a **streamlined and integrated management and regulatory framework** to reduce compliance complexities and improve decision-making processes.

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Scope of the SEA

Scale of Assessment
- National
- Provincial
- Local

Aquaculture Environment
- Inshore & Onshore (along the coastline)
- Inland (dams, ponds, rivers)
- Land-based (artificial)

Production Systems
- Cages
- Longlines, rafts & racks
- Flow-through
- Recirculation tanks
- Dams & ponds

Priority Aquaculture Species

Marine
- Finfish (Kob & Salmon)
- Abalone
- Mussels
- Oysters
- Prawns
- Seaweed

Freshwater
- Finfish
  - Trout (Brown & Rainbow)
  - Tilapia (Mozambican & Nile)
  - Catfish (African Sharptooth)

Legal Framework
- Acts & Ordinances, incl. Bills
- Regulations, Guidelines & Policies
- Norms & Standards
- Authorisations, Licences & Permits

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Refinement of Scope during Inception phase

Based on the roadshow and Focus Group meetings, literature review, inputs from DAFF and other stakeholders, the following are excluded from the scope of the SEA:

- **Offshore** (open ocean, typically > 3 km offshore) as a suitable aquaculture environment for development

  Reason: SA offshore coastline is a high risk for aquaculture development due storm severity, very high capital costs, etc

- **Freshwater crayfish**:
  - *Cherax quadricarinatus* (Redclaw)
  - *Cherax tenuimanus* (Marron)

  Reason: These species are highly invasive (NEMBA Category 1b & 2), compete with indigenous species & are carriers of parasites.

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Key environmental impacts / risks identified

Applicable to marine and/or freshwater aquaculture activities:

Water bodies	Biodiversity	Animal health	Heritage	Pollution	Waste production	Farm infrastructure	Climate change
Change in quality	Introduction of exotic species	Spread of pathogens/diseases	Palaeontology	Effluent discharges	Accumulation of solid waste (organic & inorganic)	Habitat modification	Increase in storm frequencies
Change in quantity	Escape of farmed alien species	Parasitic infections	Archaeology	Chemical residues	Deposition of debris	Negative aesthetics	Rising sea levels
Temperature fluctuations	Hybradization due to genetically modified organisms	Harmful algal blooms	Cultural-historical & visual sites	Release of biotoxins	Waste from feeds	User conflict e.g. tourism & shipping	Increase in water temperature
Increase in turbidity	Excessive sourcing wild brood stock	Genetic integrity of wild brood stock		Use of fertilizers		Entanglement & injury or death of birds, mammals & other fish	Increase in ocean acidification
Change in flow rates	Overuse of fishery resources as feed			Nutrient discharges			Increase in harmful algal blooms
Increase in sedimentation							Increase in vulnerability to pathogens/diseases
Decrease in nutrients							Increase in flooding
Upstream/ downstream effects							Increase in drought

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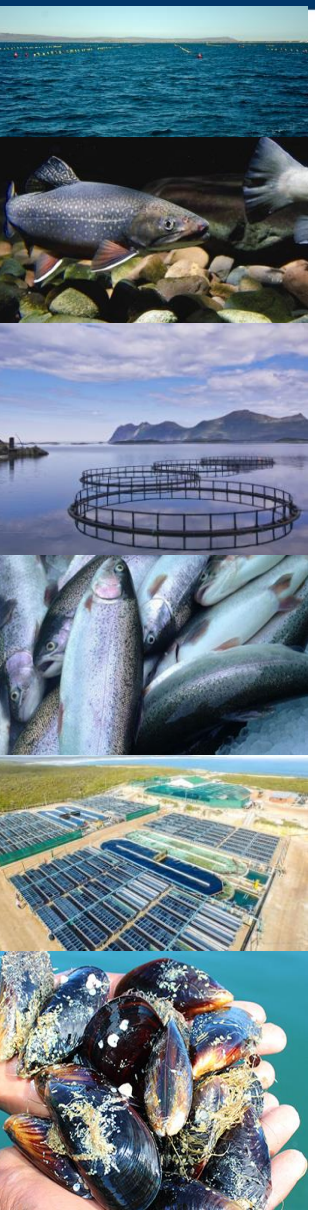
Key outputs of the SEA



- **Optimal aquaculture areas/habitats** in South Africa.
- **Environmental compliance framework** (standards) for streamlined & integrated decision-making to reduce (or limit) the need for permitting & authorisations.
- **Environmental screening & risk assessment** for aquaculture in SA that can be continuously updated & maintained by DEA & DAFF.
- **Generic Environmental Management Plan** (EMP) for the management of aquaculture activities in South Africa.

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Stakeholder engagement

- Setup **stakeholder engagement process:**
  - Stakeholder database (comprising authorities, NGOs, research & industry);
  - Project Steering Committee (PSC);
  - Expert Reference Group (ERG).
- Launched the **SEA process:**
  - Advert published in 4 national scale newspapers;
  - Advert/article published on CSIR, DEA & DAFF websites;
  - Created **SEA website** (http://aquasea.csir.co.za/);
  - Created **SEA e-mail** account (aquasea@csir.co.za);
  - Prepared and released the **Background Information Document (BID).**

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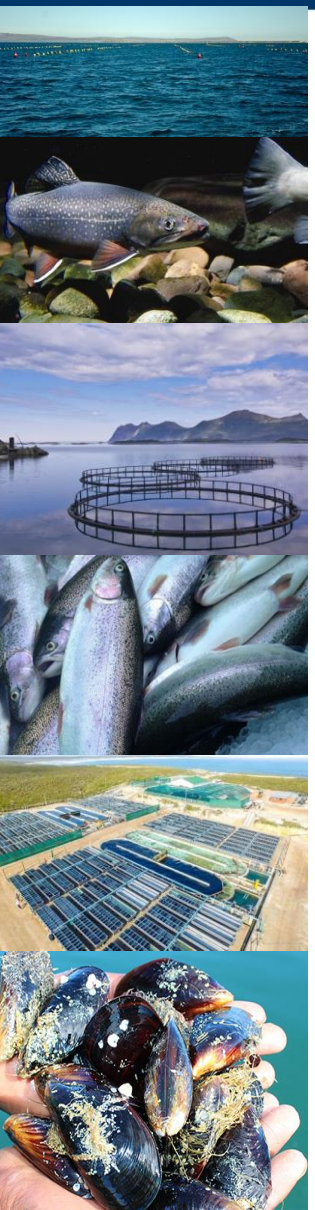
Project Steering Committee



- The **Project Steering Committee** (PSC) comprises authorities with a legislated decision-making mandate for aquaculture development in SA (incl. DEA, DAFF, DWS, DMR, DPME, DPE, DPW, DST, DTI, DRDLR, TNPA & 9 provinces)
- The <u>purpose</u> of the PSC is:
  - To inform, guide and monitor the implementation of the SEA process;
  - To coordinate the mandates of all organs of state in an integrated manner;
  - To facilitate sustainable development and ensure legal compliance; and
  - To facilitate discussion on the outcomes of the SEA so that they may be adopted and implemented by government.

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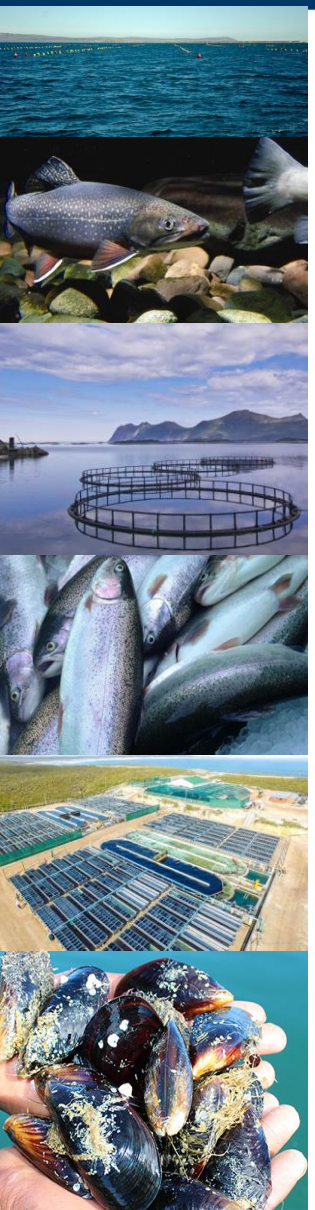
Expert Reference Group



The ERG comprises representatives of the following:

- South African Aquaculture Industry Associations
- Directorates from DEA Oceans and Coasts, Biodiversity & Conservation, Environmental Programmes & Integrated Environmental Authorisations
- DAFF Fisheries Branch
- Department of Water and Sanitation (DWS)
- South African National Biodiversity Institute (SANBI)
- South African Institute for Aquatic Biodiversity (SAIAB)
- Agricultural Research Council (ARC)
- Provincial representatives (e.g. from nature conservation & planning departments)
- NGOs e.g. WWF South Africa
- Relevant research bodies and academia.

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Expert Reference Group

- The purpose of the ERG is:
  - **verify** that the process proposed at the outset of the SEA has been implemented in a fair and unbiased manner in that suitably experienced experts have been involved in the process;
  - **review** structures have been designed and implemented in a credible manner; and
  - **queries/comments** from the public have been adequately **addressed**.

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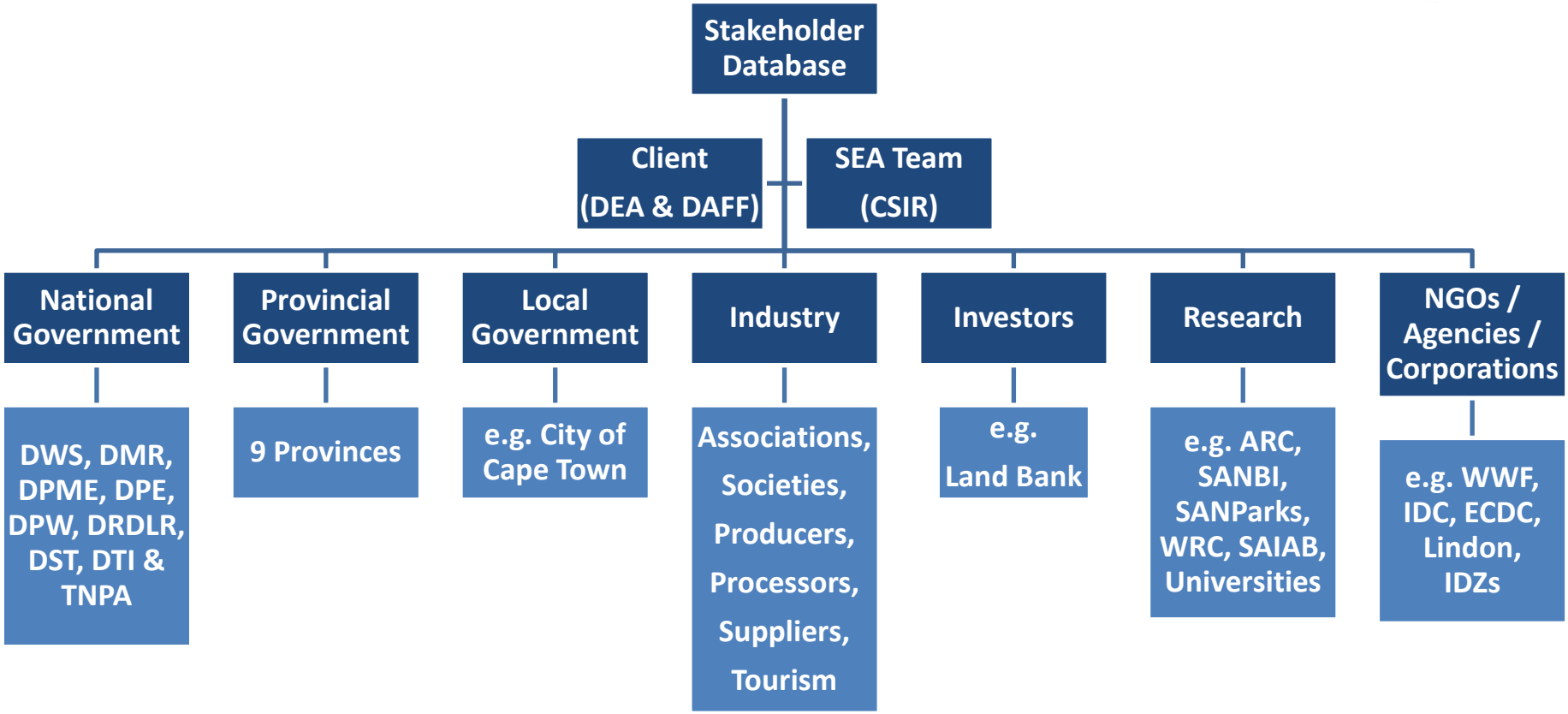
Stakeholder database



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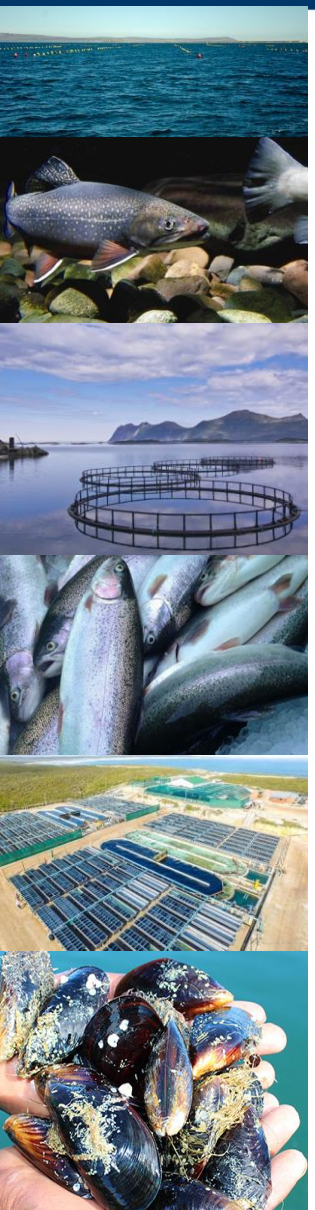
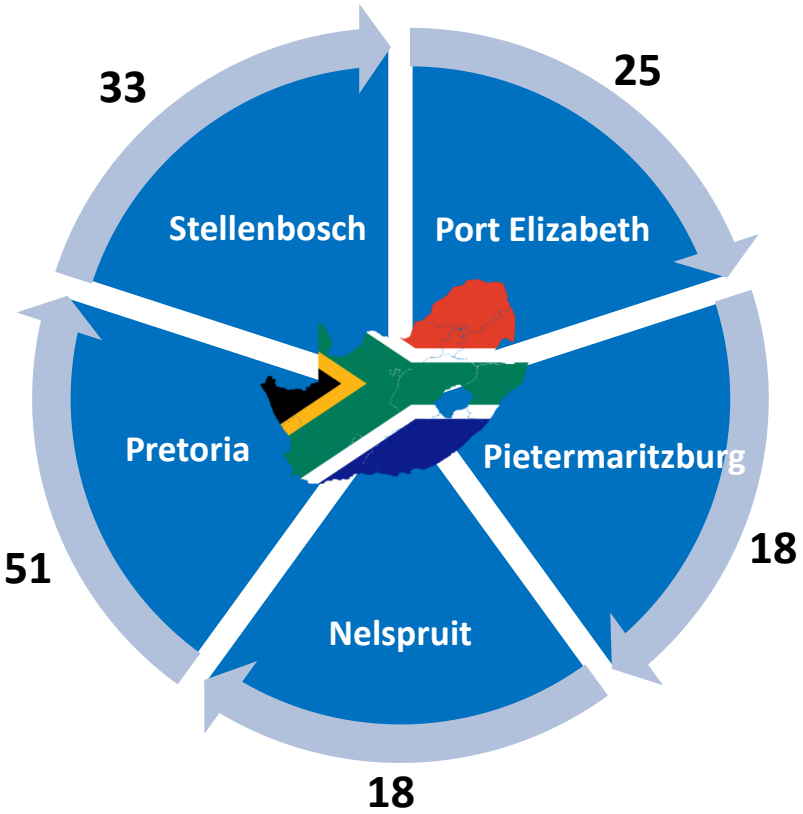
Focus Group Meeting Roadshow



30 Sep – 7 Oct 2016



- Stellenbosch → Northern Cape, Western Cape
- Pretoria → Gauteng, Free State, Limpopo, North West
- Nelspruit → Mpumalanga
- Pietermaritzburg → KwaZulu-Natal
- Port Elizabeth → Eastern Cape

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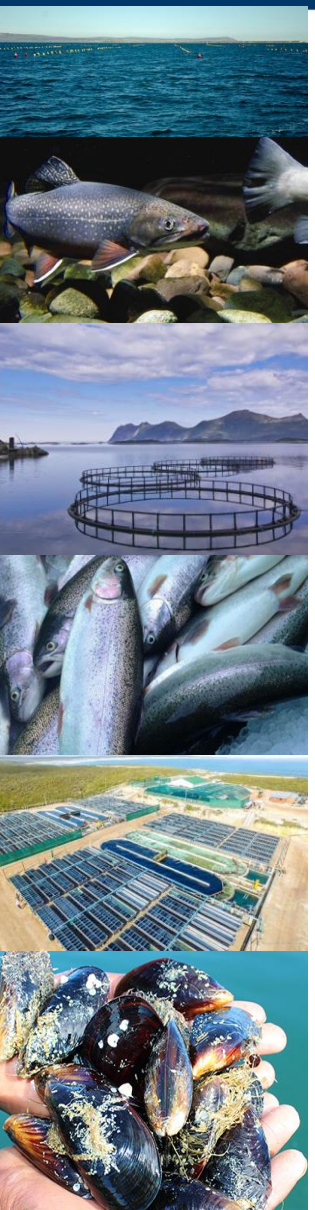
Key points from Focus Group Meetings



- Ornamental fish species should be included in the scope.
  response: capturing in existing facility database, not being included in SEA due to vast diversity of species, different production focus, etc
- Processing and post-processing activities should be included in the scope.
  response: downstream processing moves into different domain of legislation for food processing (as for other food industry activities) and outside scope of this SEA
- Freshwater aquaculture is currently being governed through provincial nature conservation legislation and not through national agriculture & fisheries legislation.
- DWS is developing new General Authorisation regulations for aquaculture.
- SEA to consider different economies of scale, i.e. small scale (subsistence & artisanal) versus large scale commercial production.
- Include mapping and review of existing aquaculture facilities should include the decommissioned and failed/closed projects, incl. state-owned hatcheries, as these can provide learning as to why they did not work out.

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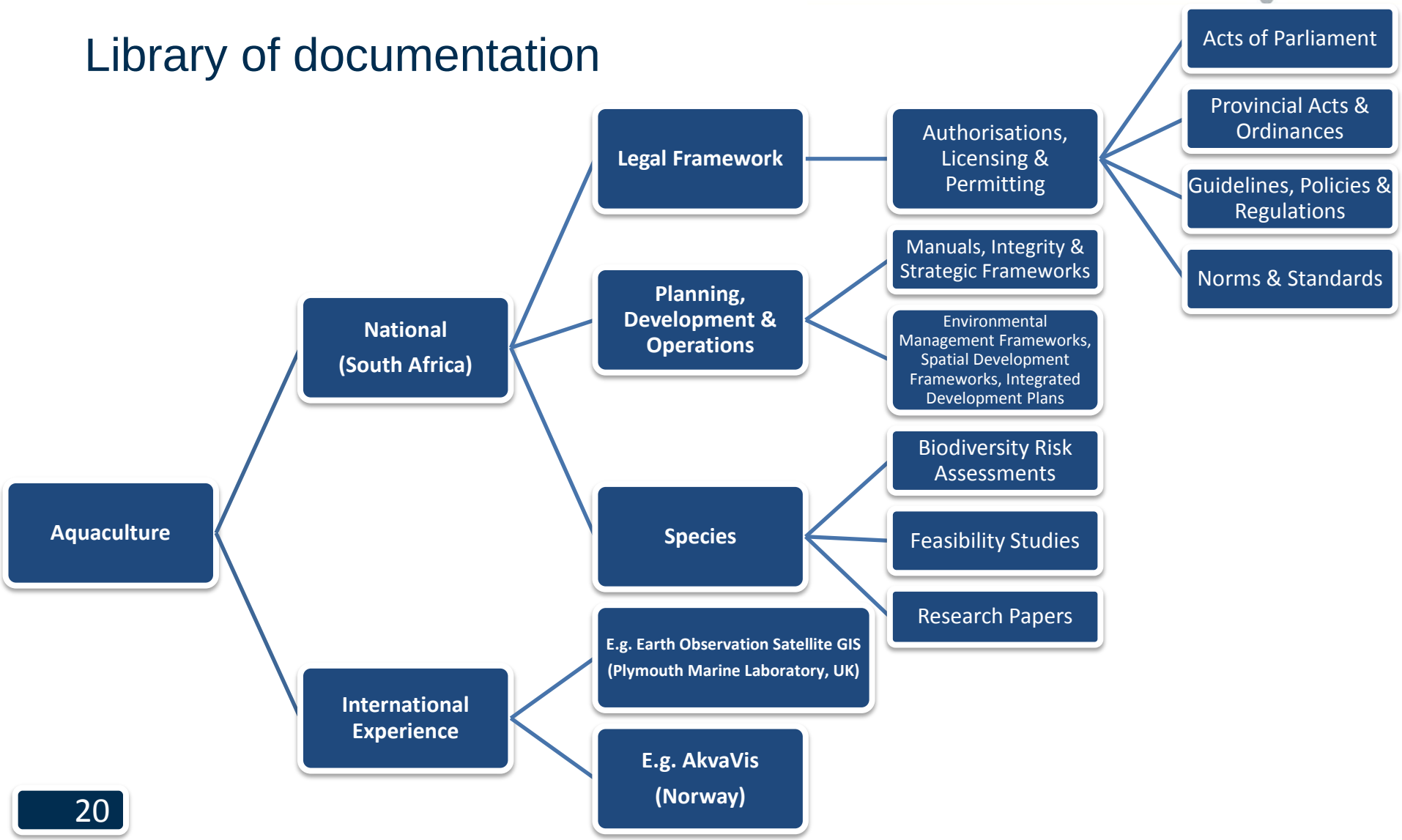
Overview of literature & regulatory requirements

Library of documentation



Summary of Phase 1 outcomes

Key tasks completed for Phase 1:

- SEA website, Background Information Document, Announcements
- Stakeholder engagement programme and database
- PSC and ERG established (meetings 07 June and 22 Nov 2016)
- Road show and focus group meetings across provinces
- Refinement of scope of SEA
- Literature review and collation of relevant base information

Additional task (conduct during Phase 2: Screening)

- Collate a project description for aquaculture in marine and freshwater environment, in consultation with stakeholders and for review by PSC and ERG → inform the assessment phase

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Phase 2: Screening - Data capture & mapping

FACILITY NAME

LOCATION
(Lat-Long + province + closest town)

AQUACULTURE TYPE
(e.g. marine, freshwater, offshore, inshore, inland)

OPERATIONAL SYSTEM
(e.g. flow-through, re-circulation, ponds, dams, tanks, cages, long lines, rafts)

CATEGORY
(e.g. mollusc, finfish, shellfish, plants, sea squirts, crustaceans)

SPECIES COMMON NAME
(e.g. Abalone)

SPECIES SCIENTIFIC NAME
(e.g. *Haliotis midae*)

Feed (e.g. commercial feed, phytoplankton filterfeeding)

SPECIES STATUS
(e.g. alien / indigenous)

RIVER SYSTEM & CATCHMENT
(primary + quaternary + subquat)

SCALE
(Small-scale/Artisanal < 20 000 kg/yr; Commercial/Industrial > 20 000 kg/yr)

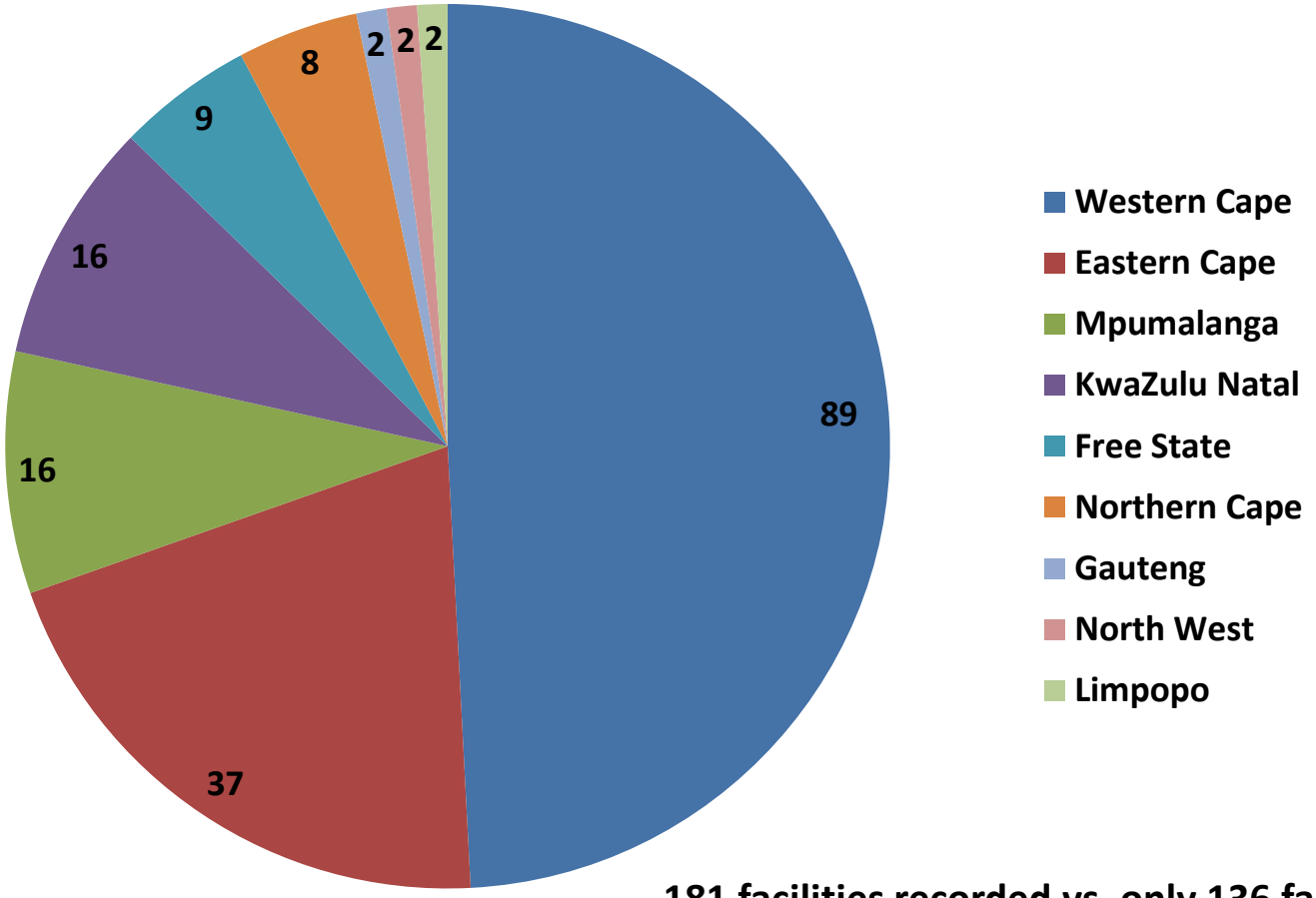
NUMBER OF PEOPLE EMPLOYED

INDUSTRY
(e.g. food production / recreation)

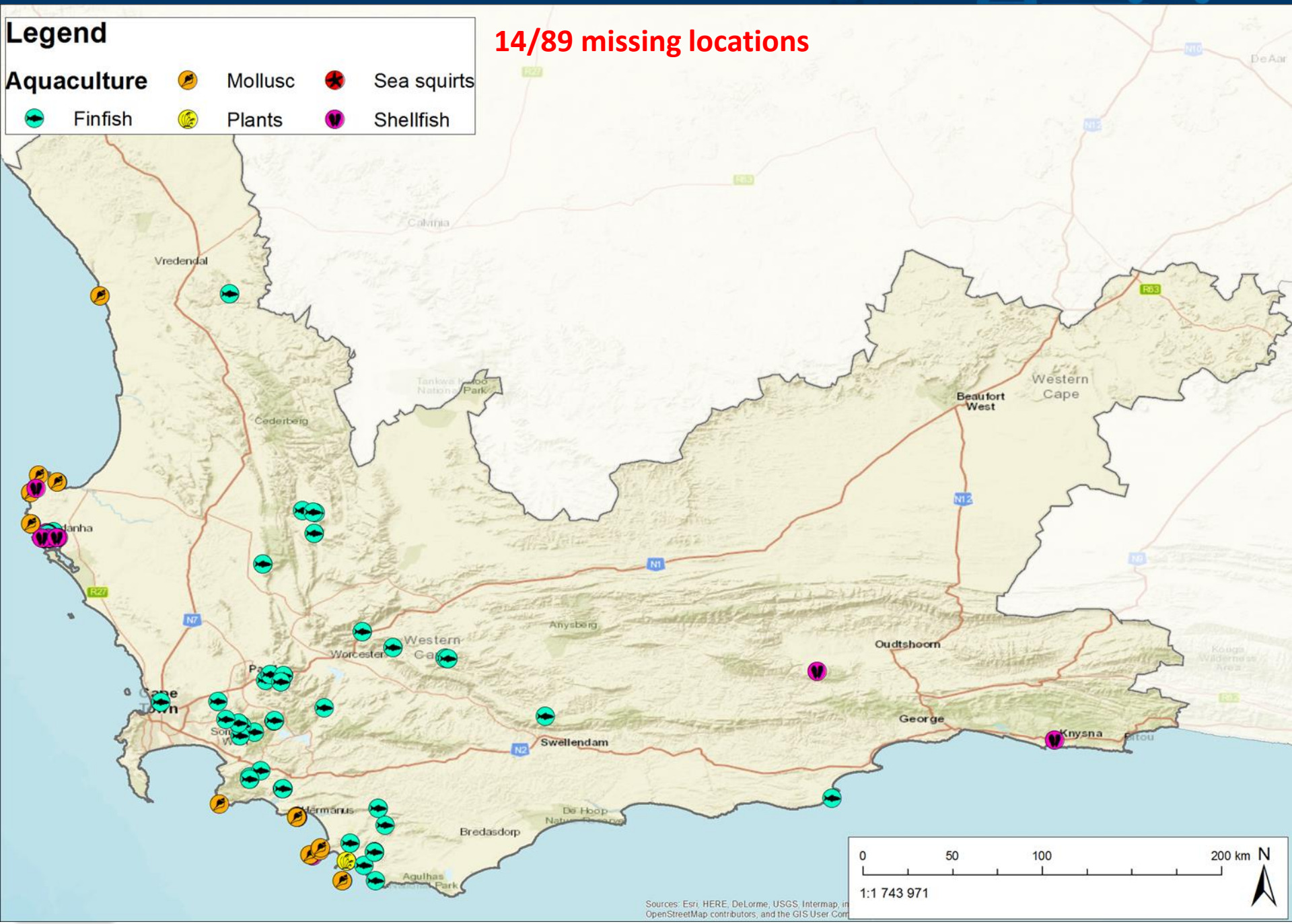
FACILITY STATUS
(operational, non-operational, proposed

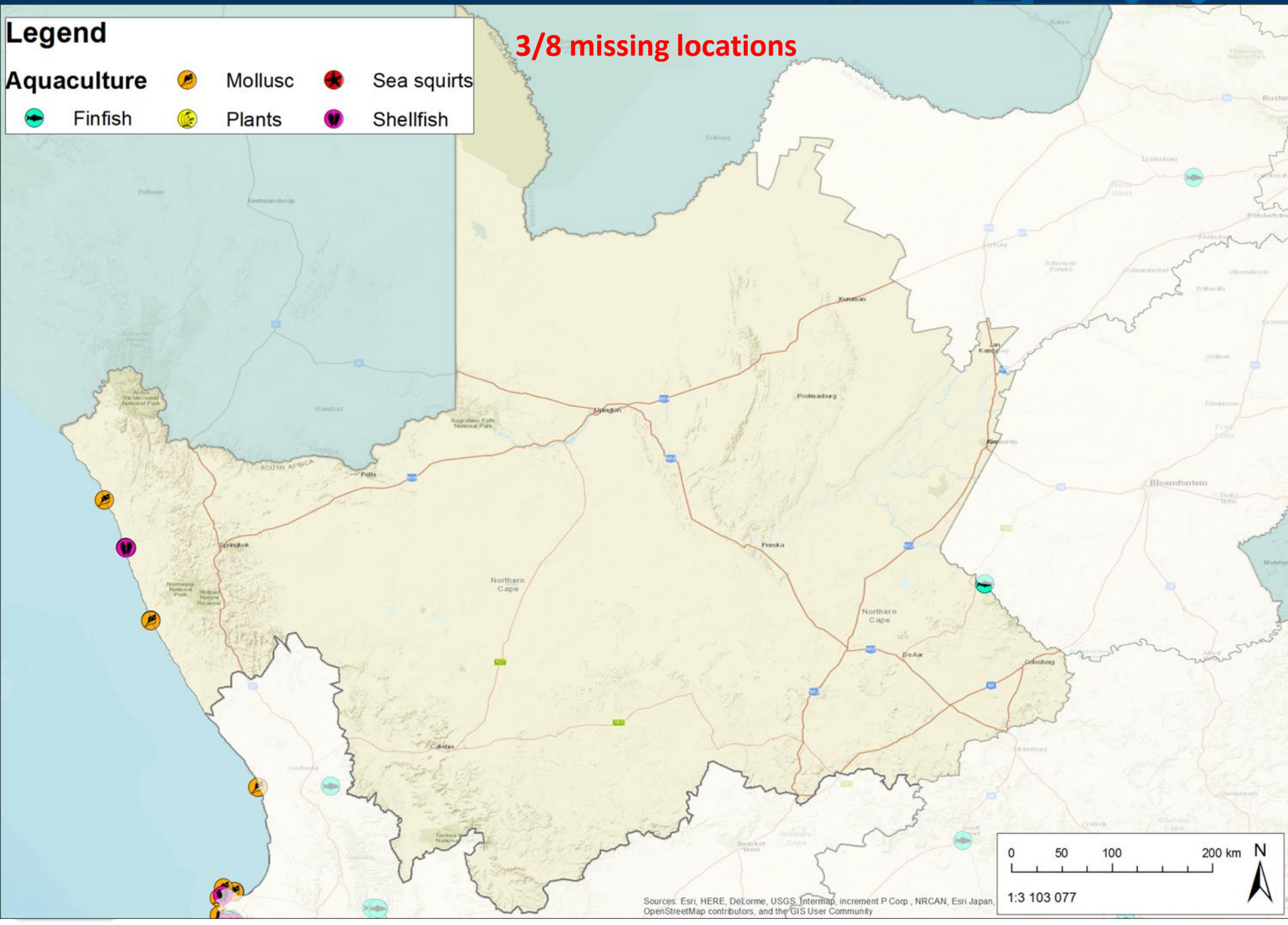
Existing facilities data collected thus far

Number of aquaculture facilities per province (Nov 2016)



181 facilities recorded vs. only 136 facilities in Sept ’16
However, data still very porous w.r.t. other data fields


Legend
Aquaculture
Mollusc
Sea squirts
Finfish
Plants
Shellfish
14/89 missing locations
Vredendal
Cederberg
Western Cape
Beaufort West
Worcester
Swellendam
Oudtshoorn
George
Knysna
Hermanus
Bredasdorp
De Hoop Nature Reserve
Agulhas National Park
0
50
100
200 km
N
1:1 743 971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Finfish
Mollusc
Plants
Sea squirts
Shellfish
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Northern Cape
Prieska
Postmasburg
Upington
Kuruman
Bloemfontein
De Aar
Colesberg
Calvinia
0 50 100 200 km
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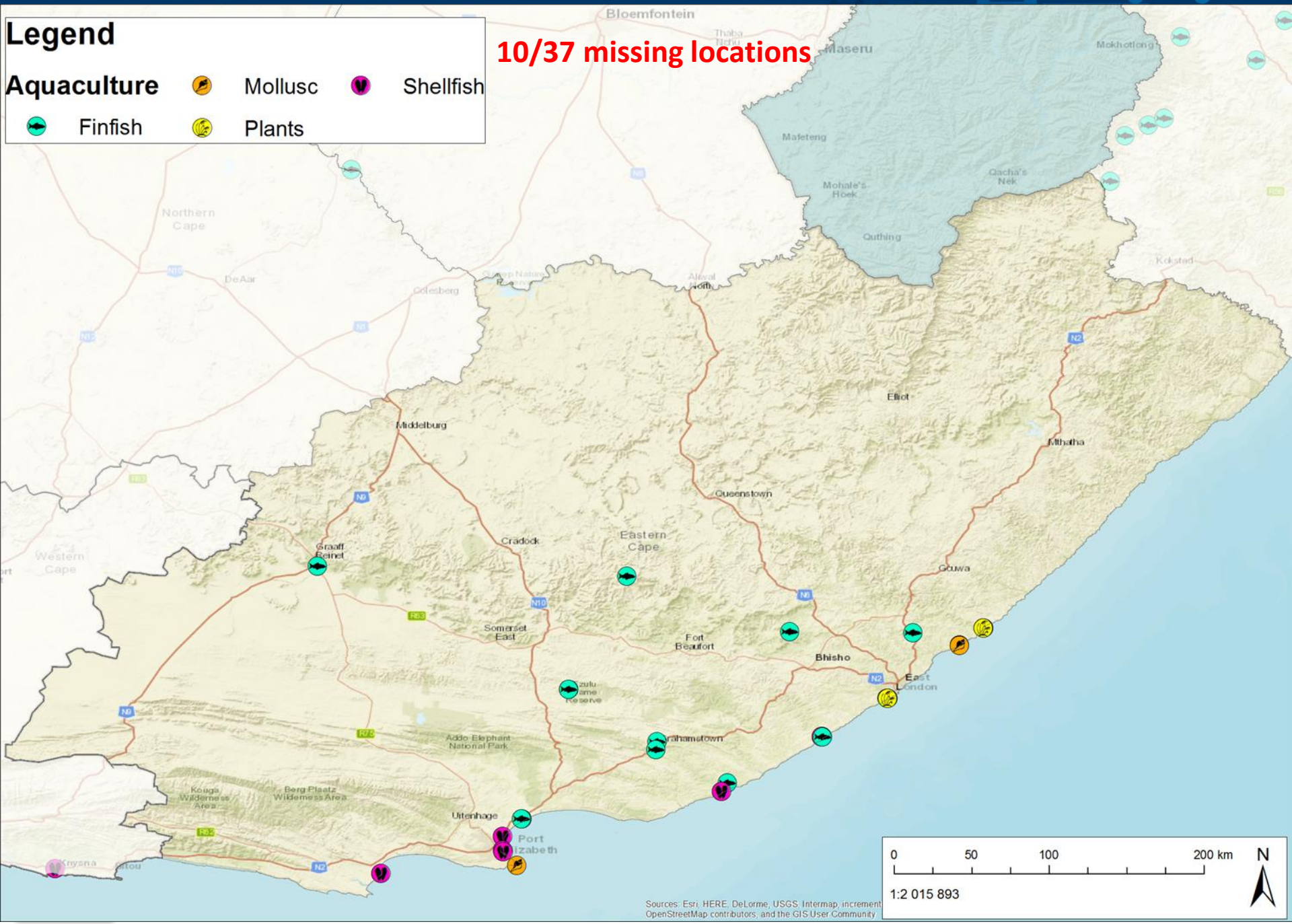
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, OpenStreetMap contributors, and the GIS User Community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Aquaculture
Mollusc
Shellfish
Finfish
Plants
10/37 missing locations
Bloemfontein
Maseru
Mokhotlong
Mafeteng
Mohale's Hoek
Qacha's Nek
Quthing
Northern Cape
Colesberg
Middelburg
Graaff Reinet
Cradock
Eastern Cape
Western Cape
Somerset East
Queenstown
Elliot
Mthatha
Gqwa
Fort Beaufort
Bhisho
East London
Grahamstown
Addo Elephant National Park
Uitenhage
Port Elizabeth
Knysna
0
50
100
200 km
1:2 015 893
N
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment
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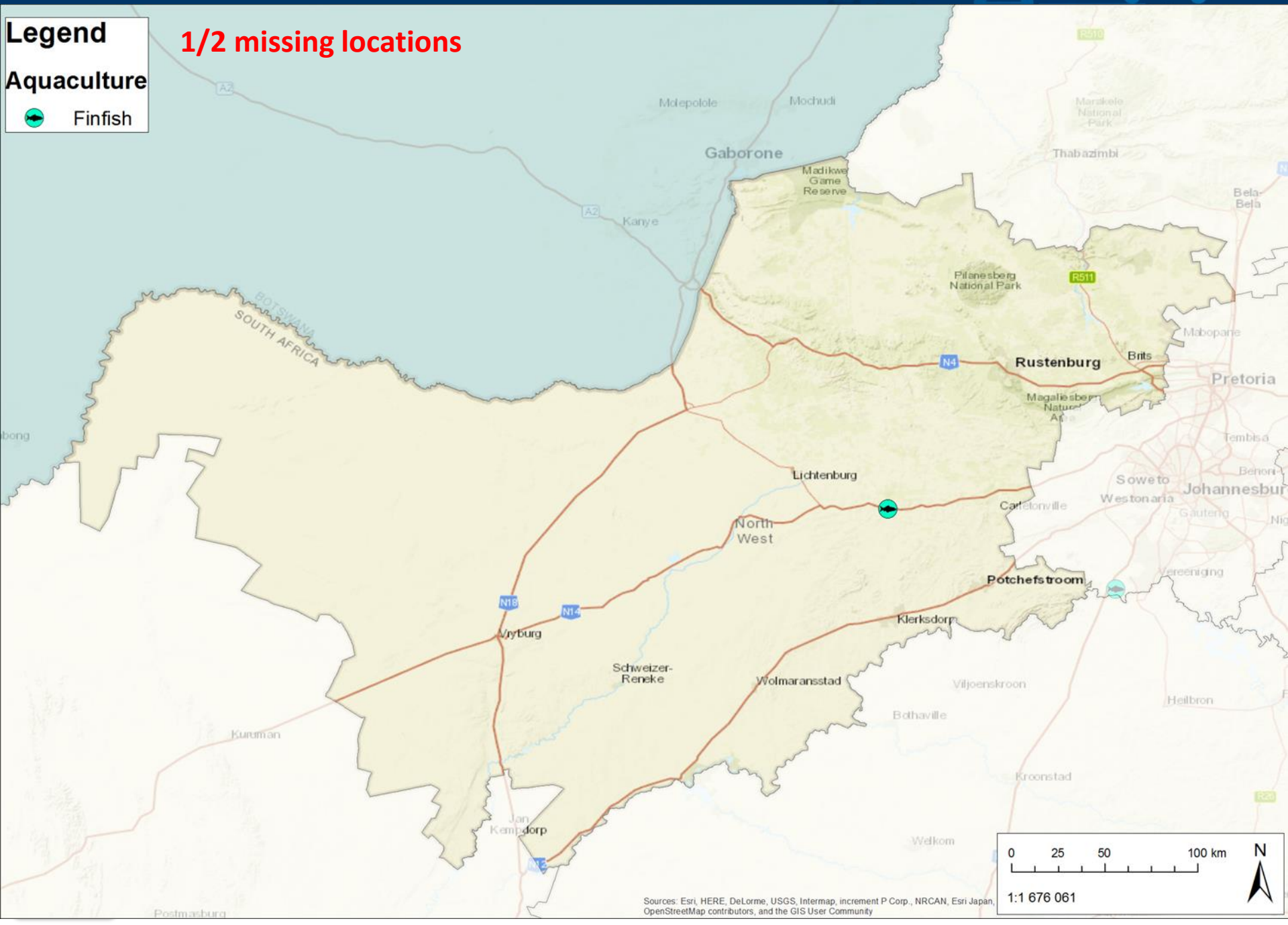
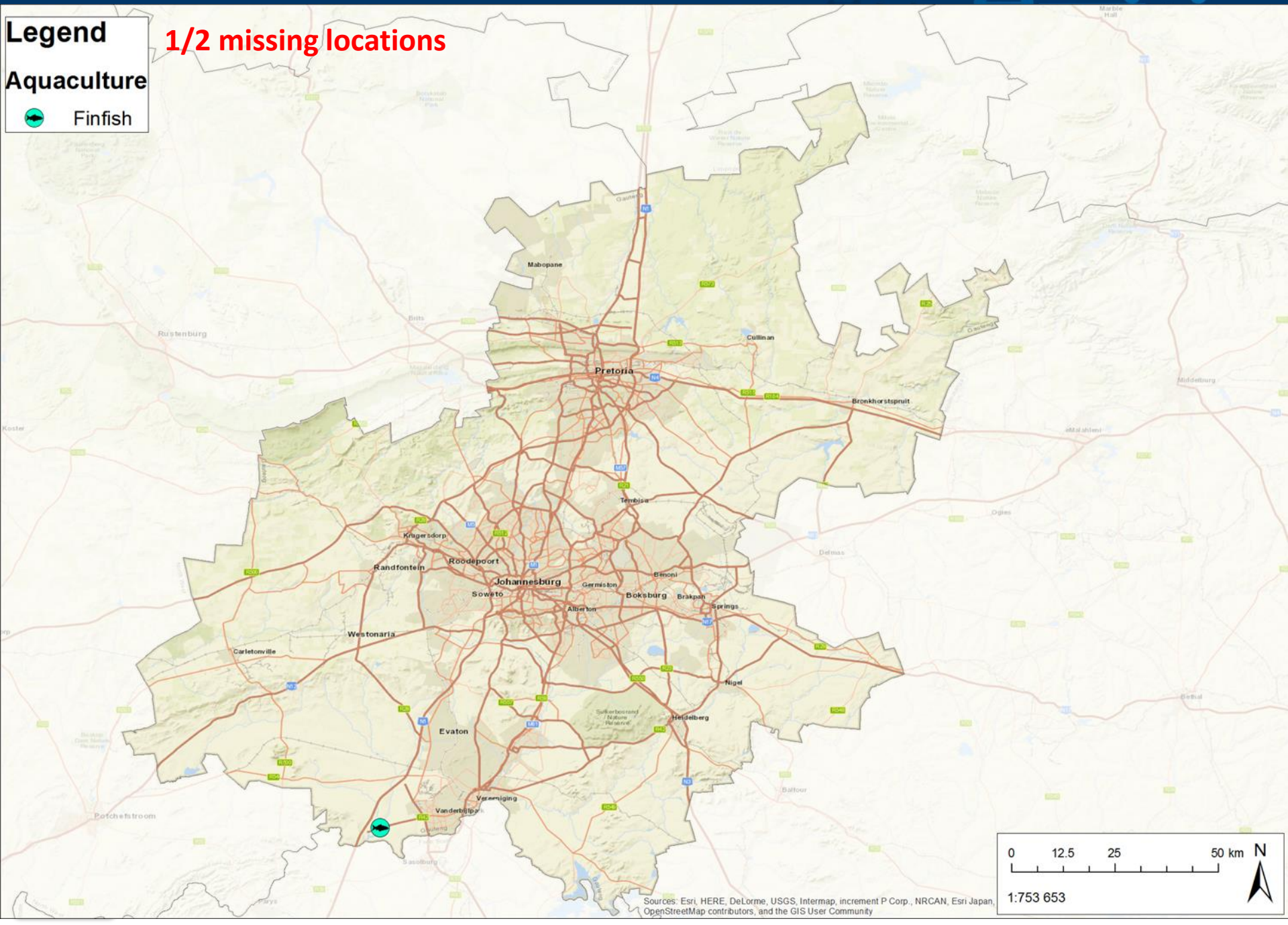
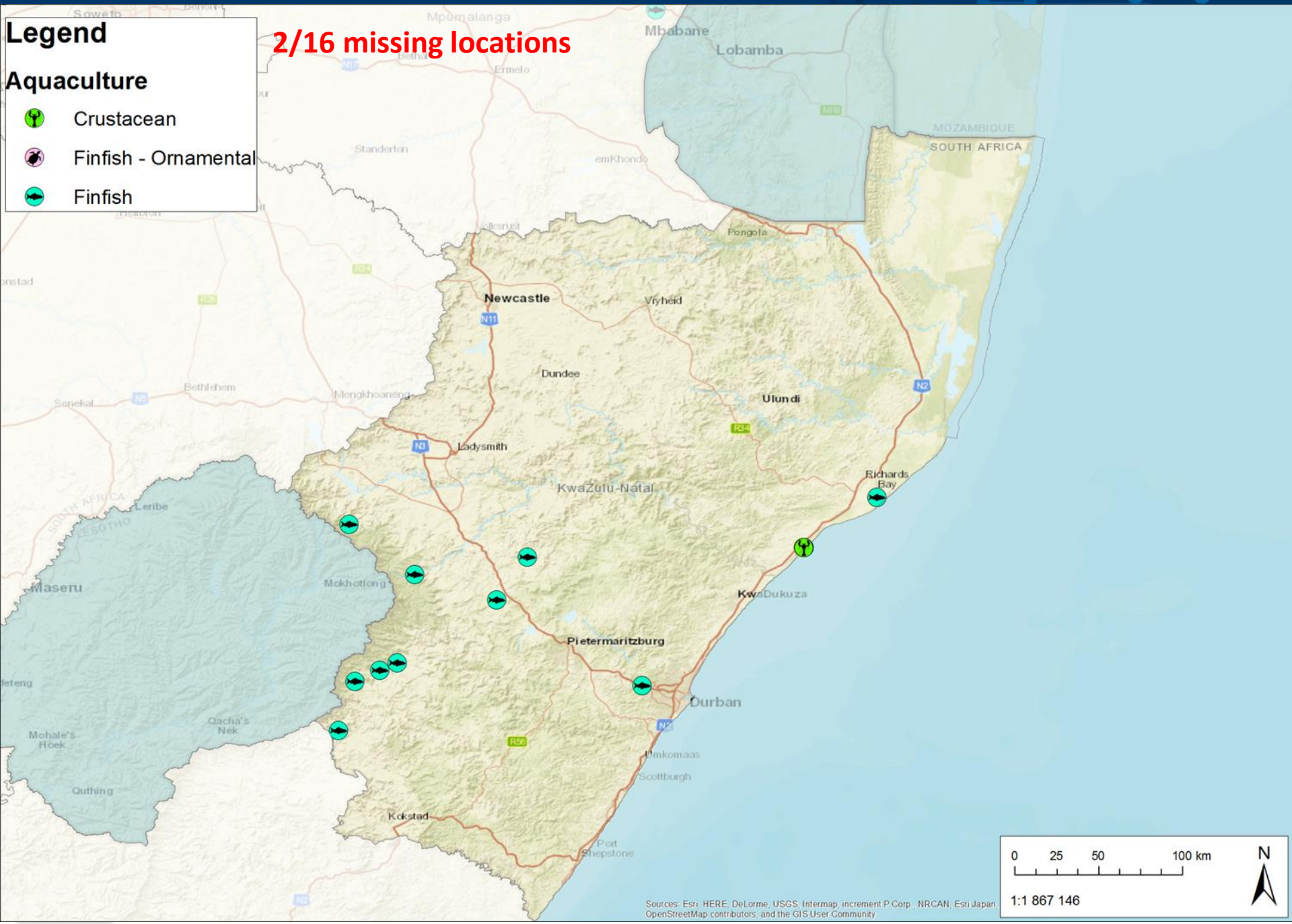

Legend
Aquaculture
Finfish
1/2 missing locations
Gaborone
Molepolole
Mochudi
Kanye
Madikwe Game Reserve
Thabazimbi
Bela-Bela
Pilanesberg National Park
R511
N4
Rustenburg
Brits
Mabopane
Pretoria
Magaliesberg Nature Area
Tembisa
Soweto
Westonaria
Johannesburg
Carletonville
Lichtenburg
North West
Potchefstroom
Klerksdorp
N18
N14
Vryburg
Schweizer-Reneke
Wolmaransstad
Viljoenskroon
Bothaville
Heilbron
Kuruman
Kroonstad
Welkom
Postmasburg
BOTSWANA
SOUTH AFRICA
0 25 50 100 km
1:1 676 061
N
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, OpenStreetMap contributors, and the GIS User Community


Legend
Aquaculture
Finfish
1/2 missing locations
Mabopane
Pretoria
Cullinan
Bronkhorstspruit
Rustenburg
Tembisa
Krugersdorp
Randfontein
Roodepoort
Johannesburg
Soweto
Germiston
Benoni
Boksburg
Brakpan
Springs
Alberton
Westonaria
Carletonville
Nigel
Heidelberg
Evaton
Vereeniging
Vanderbijlpark
Potchefstroom
Sasolburg
Balfour
Delmas
Middelburg
Ogies
Bethal
0
12.5
25
50 km
N
1:753 653
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, OpenStreetMap contributors, and the GIS User Community


Legend
Aquaculture
Crustacean
Finfish - Ornamental
Finfish
2/16 missing locations
Mpumalanga
Mbabane
Lobamba
MOZAMBIQUE
SOUTH AFRICA
Standerton
Ermelo
Pongola
Newcastle
Vryheid
Dundee
Ulundi
Ladysmith
KwaZulu-Natal
Richards Bay
Bethlehem
Senekal
Leribe
LESOTHO
Maseru
Mokhotlong
KwaDukuza
Pietermaritzburg
Durban
Qacha's Nek
Mohale's Hoek
Quthing
Umkomaas
Scottburgh
Kokstad
Port Shepstone
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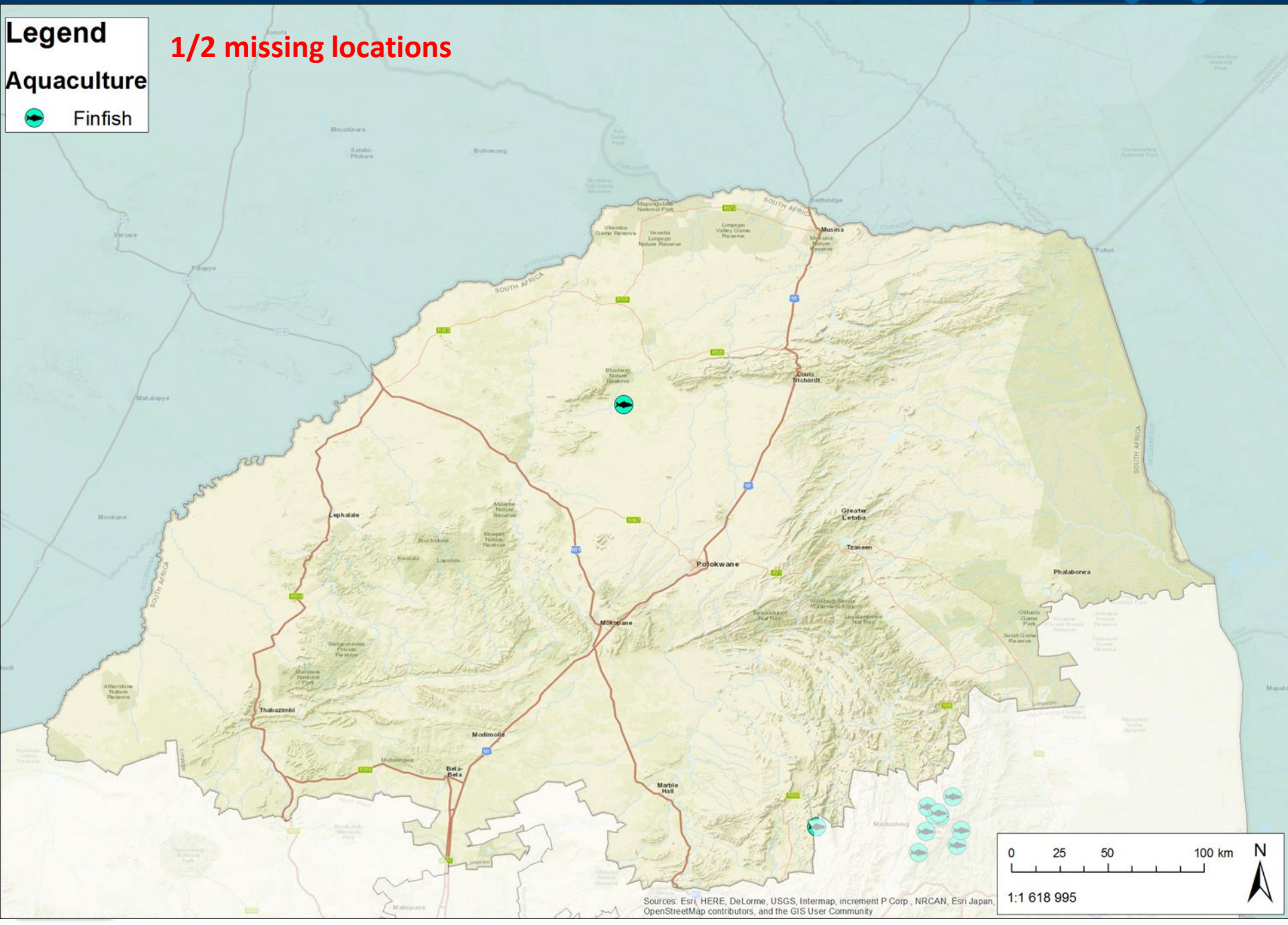
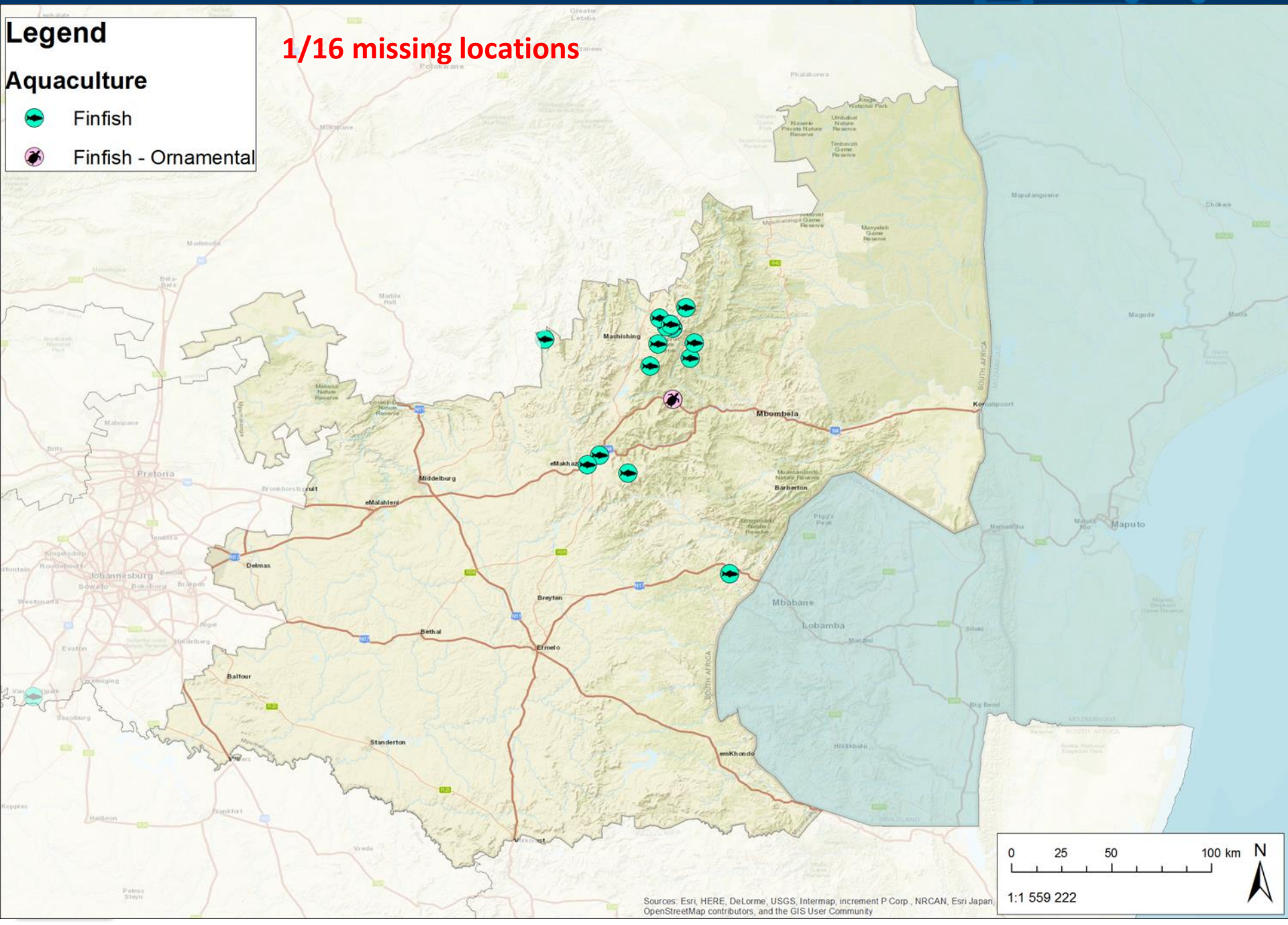
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, OpenStreetMap contributors, and the GIS User Community


Legend
Aquaculture
Finfish
1/2 missing locations
Musina
Louis Trichardt
Lephalale
Polokwane
Greater Letaba
Tzaneen
Phalaborwa
Mokopane
Thabazimbi
Modimolle
Bela-Bela
Marble Hall
0 25 50 100 km
1:1 618 995
N
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, OpenStreetMap contributors, and the GIS User Community


Legend
Aquaculture
Finfish
Finfish - Ornamental
1/16 missing locations
Mashishing
Mbombela
eMakhazeni
Middelburg
eMalahleni
Delmas
Breyten
Bethal
Ermelo
Balfour
Standerton
emKhondo
Barberton
Mbabane
Lobamba
Maputo
Pretoria
Johannesburg
0
25
50
100 km
N
1:1 559 222
Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, OpenStreetMap contributors, and the GIS User Community

Identifying optimal aquaculture areas – Proposed method

Collate existing spatial data ★ We are here

Classify features as pull and push factors

Weight pull and pull factors

Analyse to extract optimal aquaculture areas

Identifying optimal aquaculture areas – Proposed method

1) COLLATE EXISTING SPATIAL DATA

For example:

- **Environmental features** (e.g. rivers, dams, coastline)
- **Conservation planning**
  - Aquatic
  - Terrestrial
- **Land use**
  - Agriculture
  - Spatial development plans
  - Land cover
- **Infrastructure**
  - Roads
  - Towns
  - SKA
  - Renewable energy

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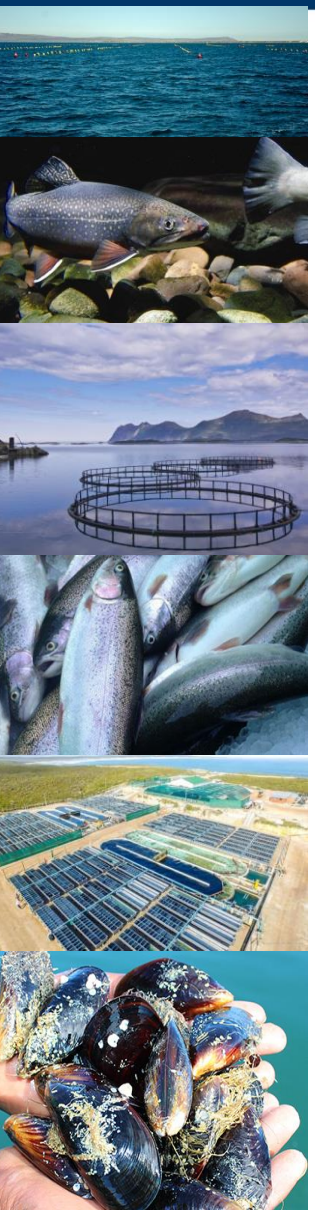

2) CLASSIFY FEATURES AS PULL & PUSH FACTORS

For example:

- **Proximity to roads = PULL**
- **Conservation priority areas = PUSH**

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Marine (offshore): What are the main pull factors?

Pull factors, for example:

- Wave height < x
- Proximity to shore < x
- Water temperature < x

Marine (offshore): What are the main push factors?

Push factors, for example:

- Wind > x
- Harmful algae bloom
- Other sea-space use, e.g. shipping
- Marine Protected Areas

Marine (inshore/offshore): What are the main pull factors?

Pull factors, for example:

- Wave height < x
- Proximity to shore < x
- Water temperature < x

Marine (inshore/offshore): What are the main push factors?

Push factors, for example:

- Wind > x
- Harmful algae bloom
- Other sea-space use, e.g. shipping
- Marine Protected Areas

Freshwater: What are the main pull factors?

Pull factors, for example:

- **Proximity to roads < x**
- **Proximity to agricultural fields < x**
- **Water bodies (not conservation priorities)**

Marine (inshore/onshore): What are the main push factors?

Push factors, for example:

- Formal Protected Areas
- Freshwater Priority Areas
- Water scarcity / drought intensity

Marine & Freshwater (land-based/artificial): What are the main pull factors?

Pull factors, for example:

- Proximity to roads < x
- Proximity to agricultural fields < x
- Water bodies (not conservation priorities)

Marine & Freshwater (land-based/artificial): What are the main push factors?

Push factors, for example:

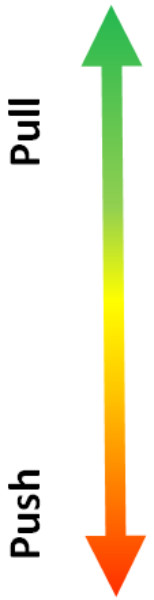
- Formal Protected Areas
- Freshwater Priority Areas
- Water scarcity / drought intensity

Identifying optimal aquaculture areas – Proposed method

3) WEIGHT PULL AND PUSH FACTORS

For example:

MARINE	
Factor/Attribute	**Weighting/Rank**
Wave height < x	9
Proximity to shore < x	9
Water temperature < x	6
Wind > x	2
Harmful algae bloom	1
Other sea-space use, e.g. shipping	1
Marine Protected Areas	0



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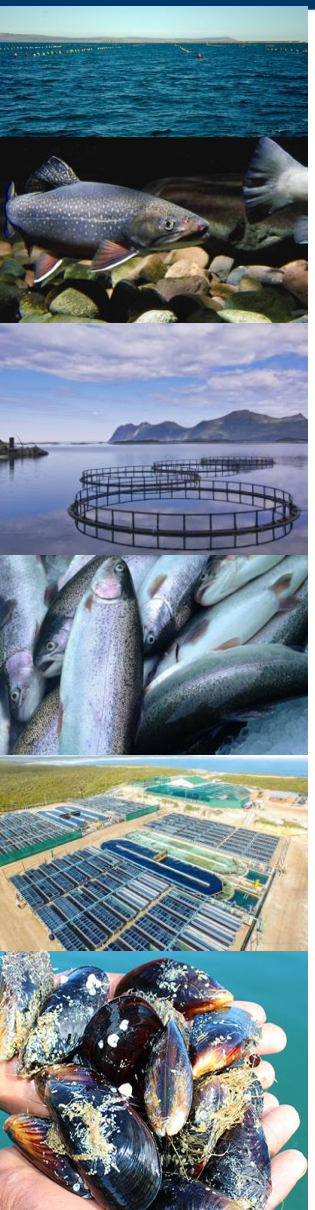
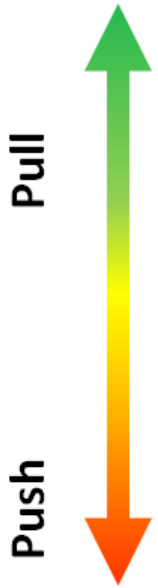


3) WEIGHT PULL AND PUSH FACTORS

For example:

FRESHWATER	
Factor/Attribute	**Weighting/Rank**
Proximity to water source < x	9
Proximity to road network < x	8
Proximity to field crops < x	7
Water scarcity / drought intensity	2
FEPAs	1
Formal Protected Areas	0



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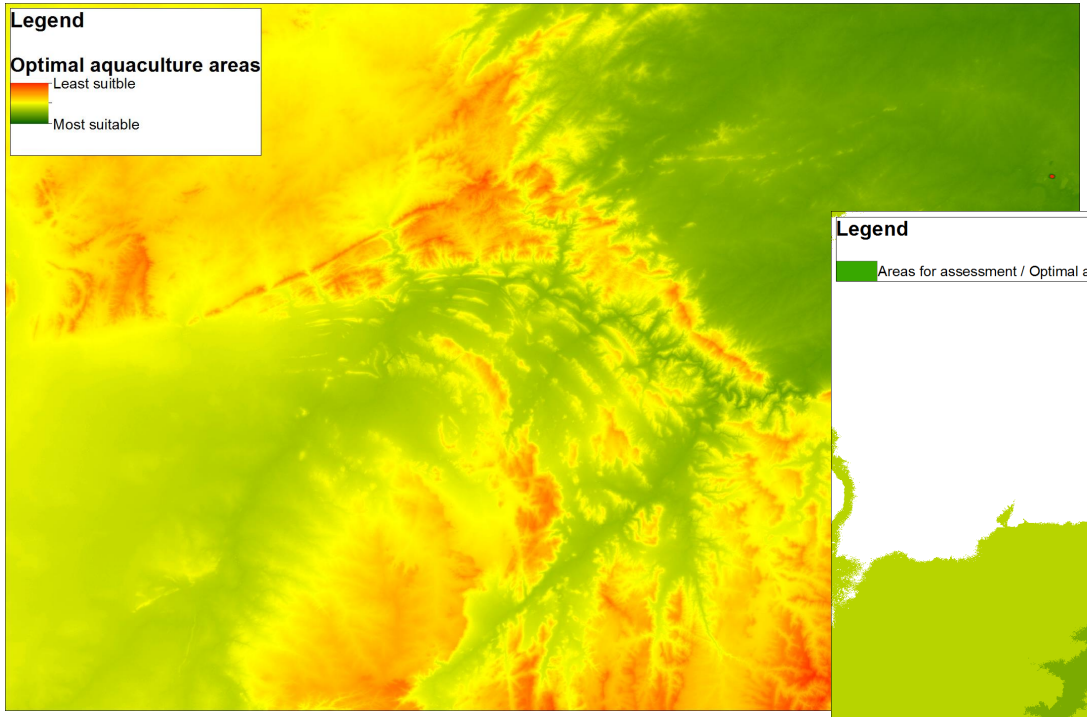
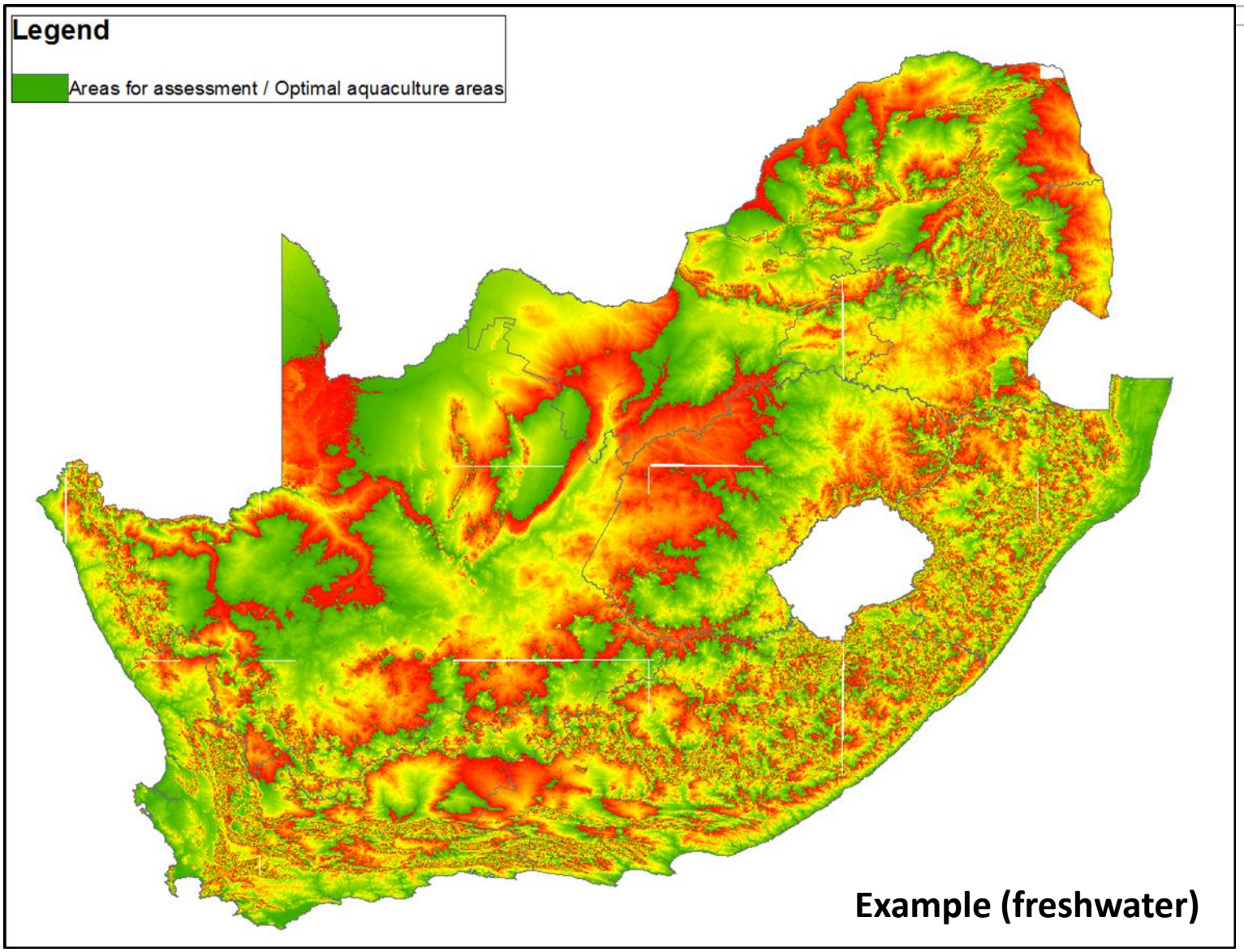
Identifying optimal aquaculture areas – Proposed method

4) SPATIAL ANALYSIS TO EXTRACT OPTIMAL AQUACULTURE AREAS FOR ASSESSMENT

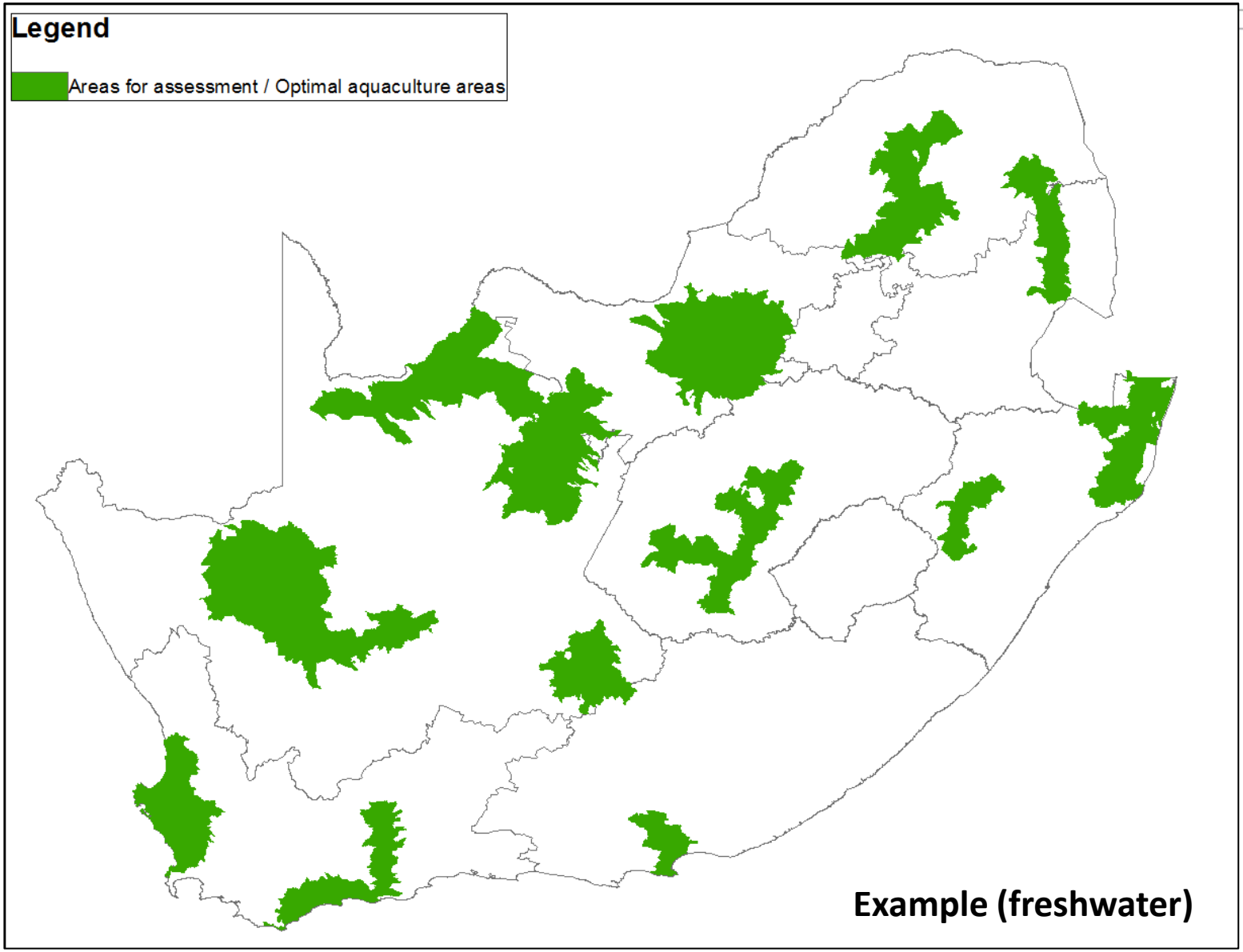
Example (freshwater):



4) SPATIAL ANALYSIS TO EXTRACT OPTIMAL AQUACULTURE AREAS FOR ASSESSMENT



4) SPATIAL ANALYSIS TO EXTRACT OPTIMAL AQUACULTURE AREAS FOR ASSESSMENT



Approach to remainder of the Screening Phase

Remaining tasks following the national-scale screening:

- Verify and update locality mapping of existing aquaculture farms;
- Classify rivers & water bodies in relation to alien fish invasion, hybridization and endemic sensitivity;
- Review and update biodiversity risk and benefit assessments for selected aquaculture species;
- Perform opportunity ('pull') and constraints ('push') analysis to identify and map the optimal/suitable aquaculture areas in SA for further assessment.

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Discussion

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