

Pantanal Case study



Google™



Session objectives

After this session you will be able to:

- Recognize how Brazil has adopted EAFm principles and moved towards EAFm (case study)
- Determine where your country is at in moving towards EAFm
- Identify challenges your country faces in moving towards EAFm



1. Good governance



2. Appropriate scale



3. Increased participation



4. Multiple objectives



5. Cooperation & coordination



6. Adaptive management

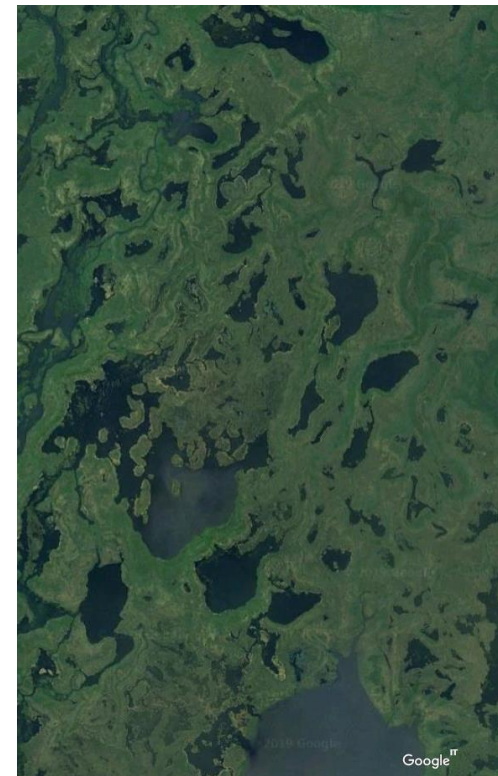


7. Precautionary approach



Overview – Brazilian Pantanal case study

- This presentation describes the fisheries and the outcome of management policies in the Brazilian part of the Pantanal
- National policies have converted fisheries of the Pantanal from a ‘food fishery’ to a recreational fishery, with impacts on the riparian population.
- At the same time external pressures are affecting the system.
- The session will discuss how:
 - The approach to fisheries management
 - How environmental laws and policies have affected the sustainability of the fisheries





Introduction to the Pantanal

- The Pantanal, is a lowland depression in the Upper Paraguay river basin.
 - world's largest continuous wetland
 - Covers ~ 140 000 km² (3% of the world's wetlands)
- Situated mainly in two Brazilian states Mato Grosso and Mato Grosso do Sul
 - smaller pockets in neighbouring Plurinational State of Bolivia (10-15%) and Paraguay (5-10%)



Source: Google Earth



Ecological: Ecosystem

- The Pantanal is a huge network of grasslands, scrubs, forests, marshes, lagoons, rivers, lakes and marshes
- One of the most biologically diverse systems in the World
- Seasonal shift between a predominantly terrestrial to a mostly aquatic ecosystem
 - Fauna and flora adapted to this dynamic ecology
 - Fish spawn at the onset of the flood and colonize flooded areas for feeding and growth
 - When the water withdraws, the fish seek refuge in permanent waterbodies in mass migrations (a phenomenon known as *lufada*)



Ecological (*cont.*): Agriculture

- Colonized by indigenous hunter-gatherers 3000 BC
- Main economic activities: cattle ranching, farming of rice, soy bean, corn, and sugar cane, artisanal fishing, and tourism (principally sportfishing).
- The wet-dry regime and the infertile land unsuitable for intensive agriculture, and the region remains thinly populated
- Surrounding plains are among the most intensively farmed areas in Brazil
 - Subject to high and increasing stress from pesticide use, damming of tributaries, deforestation, and mining of gold, diamonds, iron, and manganese
 - Deforestation on the plateaus, where the rivers feeding the Pantanal originate, cause erosion, high sediment loads and unstable river channels



Ecological (*cont.*): Threats to the Pantanal

- There are around 40 dams (mainly for hydropower) in the region and an additional 101 are planned for construction in the headwaters.
- Exotic fish species
 - transferred from the Amazon Basin,
 - escapees have established populations in the wild.
- Several exotics hybridize with native species.
- Possible future threat to the Pantanal ecosystem is the Paraguay-Paraná Waterway Project (Hidrovia)
 - Plan to interconnect Argentina, Bolivia, Brazil, Paraguay and Uruguay by converting the Paraguay and Paraná rivers into navigable canals
- Climate change is predicted to affect the alternating flood and drought cycle over the next decades affecting the Pantanal's delicate ecosystem.



Fisheries: Small-scale fisheries

Mato Grosso do Sul

- 1980s: Annual catch: 2 206 tonnes; CPUE ~ 121 kg/fisher/day
- 1994-1999: CPUE 11.5 kg/fisher/day
- By 2016: Annual catch only 187 tonnes
 - Illegal fishing (perhaps 50% of registered commercial catches)
 - subsistence fishing (focussing on non-commercial species).



Fisheries: Recreational fisheries

- In 1980's: 17 000 Recreational fishers per year
- Since the 1990's: Recreational fishers have landed at least half of the fish in most years, and in some years up to 80% of the catch.
 - the total value of the recreational fisheries was between USD 35 and 56 million.
 - 1999, Mato Grosso do Sul received 59 000 tourist fishers.
- After the peak, the number of recreational fishers sharply declined and dropped to just 15 000 by 2006

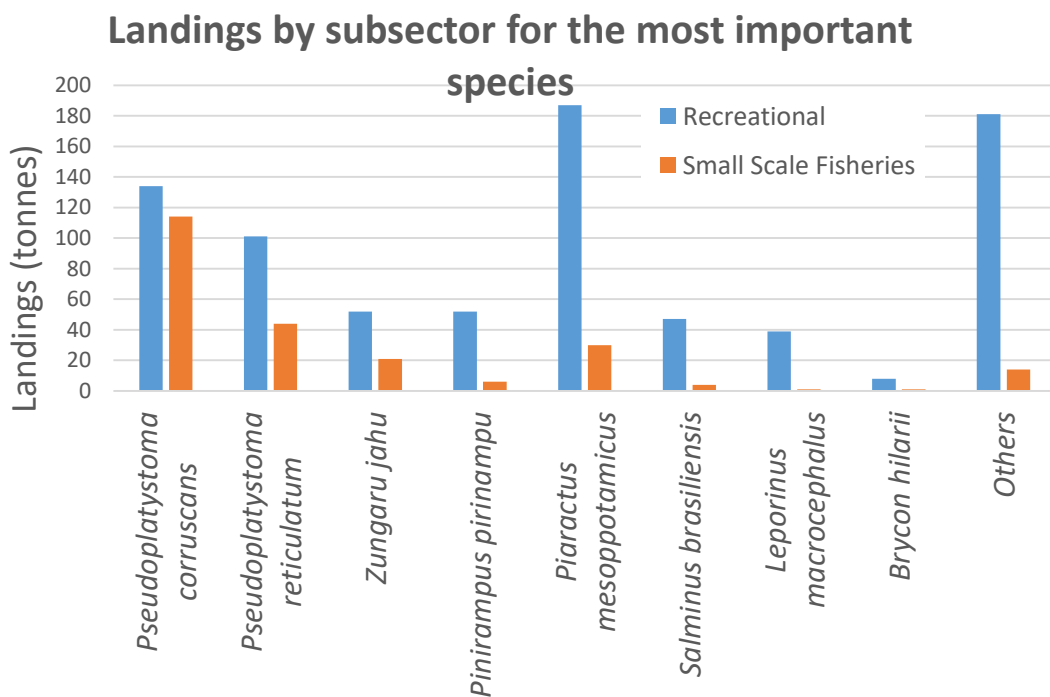


Fisheries: Recreational fisheries (*cont.*)

- Decline in number of recreational fishers appears more related to restrictions put on them (ie. catch quotas, compulsory release of fish) than competition with artisanal sector
 - 2000 quota for recreational fisheries reduced from 25 kg/trip to 15 kg/trip
 - 2003 further reduced to 10 kg plus one fish of any size and five piranhas.
 - 2006 only capture of one scaled and one scale-less fish allowed
 - For 2019, quota is 5 kg plus one fish of any size, and up to five piranhas.
- Every time the government has tightened the restrictions on the recreational fisheries fewer people have arrived in the Pantanal.



Fisheries: SSF vs recreational landings



Subsistence fishers tend to capture mostly species that are of little interest to recreational and commercial fishers such as piranhas

Data from SCPECSA/MS



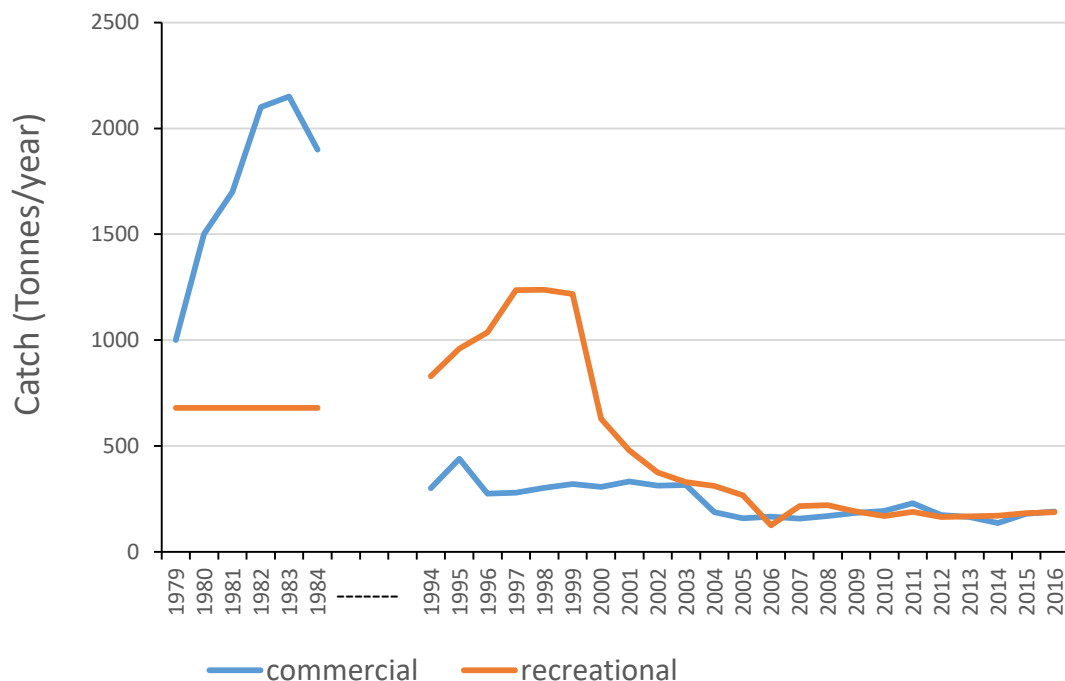
Fisheries: State of fish stocks

- Available studies indicate that *Pacu* (*Piaractus mesopotamicus*) is overfished since 1994, both abundance and size of the fish have decreased.
- The exploitation of the catfishes *cachara* (*Pseudoplatystoma reticulatum*) and *barbado* (*Pinirampus pirinampu*) are near the maximum sustainable level.
- Other species are not overfished.

Mateus, Vaz and Catella 2011.



Fisheries: Catches in the Pantanal



Catches by recreational and artisanal fishers in Mato Grosso do Sul (1979 - 2016)

Catches were higher in 1980s and declined by 2000

This is due to restrictions on fishing, to overfishing of the stock.

Data from SCPECA/MS and Mateus, Vaz and Catella 2011.



Economic contribution: environmental services

Ecosystem services provided by the Pantanal

- valued at 8 133 – 17 490 USD/ha/year (Moraes 2008)

Environmental services include:

- Reduce and delay the flood, and risk of flooding property downstream
- Remove sediment and pollutants including heavy metals
- Ensure water supply by recharging aquifers
- Fishing
- Carbon sink
- Tourism - 150 000 tourists ~ USD 150 million
- Sport fishing is the main tourist attraction valued USD 35 - 56 million per year.



Economic contribution: Income from fisheries related activities in the Pantanal

Type of activity	Necessary investment	Net earnings (USD/month)	
		Low season	High season
Bait gathering	Low	86	292
Bait middleman	Middle	106	862
Artisanal fisherman	Low	90	297
Fisherman owning a boat	High	153	1 323

From Chiaravallotti 2019



Governance: Fisheries management

- For management purposes fishers are divided in 3 groups:
 - i. subsistence fishers,
 - ii. artisanal or professional fishers and
 - iii. recreational or sportfishers.
- The second and third group of fishers are regulated,
 - only the second group is allowed to sell their catches
 - the other two may land fish for own consumption only



Governance: Fisheries management (*cont.*)

Management regulations include:

- i. minimum size for the most important commercial species
- ii. control of fishing effort through fish landing (recreational and commercial fisheries), and transportation quotas
- iii. a closed season during the reproductive period of commercially important fish species between November and February
- iv. establishment protected areas where only catch-and-release is allowed



Governance: Fisheries management (*cont.*)

- In Mato Grosso do Sul, three different laws were passed between 1983 and 1994 forbidding the use of all fishing nets
- When the regulations on fishing gear was first introduced the fishers ignored it due to the economic impact it had on them, but enforcement was strengthened
 - Initially cast nets were allowed, but only for *Prochilodus lineatus*,
 - Since 1993, cast nets banned even for this species eliminating any commercial exploitation of this species - previously one of the most important in the commercial fisheries.



Governance: Traditional Fishing gears

- Range of traditional gears use in small-scale fishery
 - Fixed buoy, buoy, cast nets, set hooks, drift nets/gillnet, bow and arrow, fish light attractor
- All are now illegal or their use severely restricted
 - This has restricted the targeting of some commercially important species
 - Enforcement has been strengthened
 - Today, commercial fishermen in the Pantanal can legally only use hook and line
- There is a catch quota of 400 kg of fish per month

Mateus, Vaz and Catella 2011.



Governance: Impact on employment

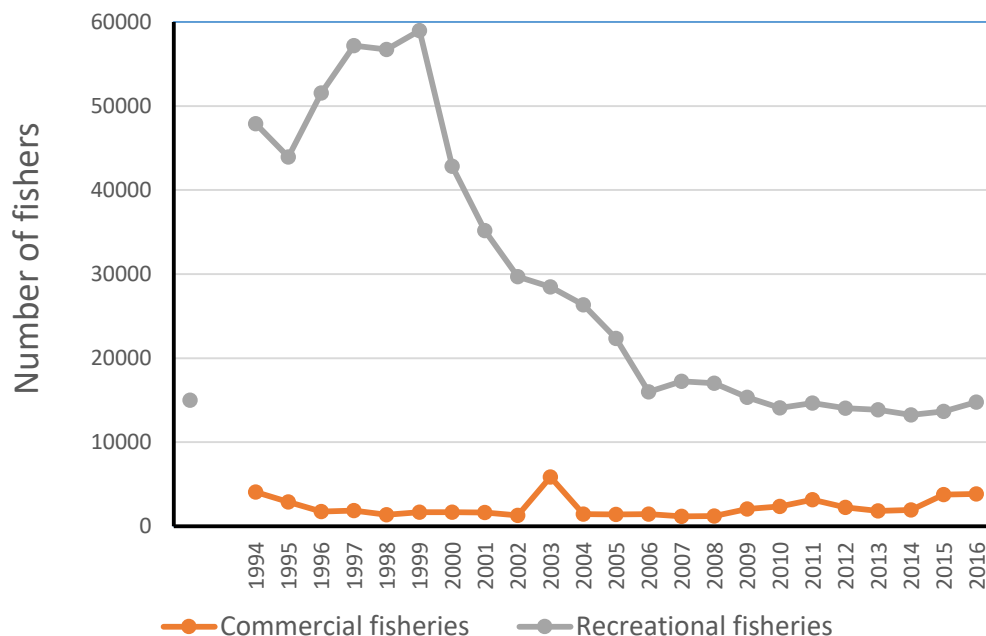
- The regulations forced professional fishermen forced to seek alternatives
 - as guides, and boat drivers
 - capturing and selling live bait to the recreational fishers
 - Bait fishers extract 16 million fish and crabs for sale to recreational fishers
- In the region of Corumbá estimated that 165 fishermen generate a gross revenue of almost USD 3 million per year
- More recently some fish farmers also specialise in producing baitfish

Barletta et al. 2016.



Governance: Commercial and recreational fisher numbers

Data from SCPECA/MS



Declining number of fishers due to restrictions

1994: 4 073 commercial fishers

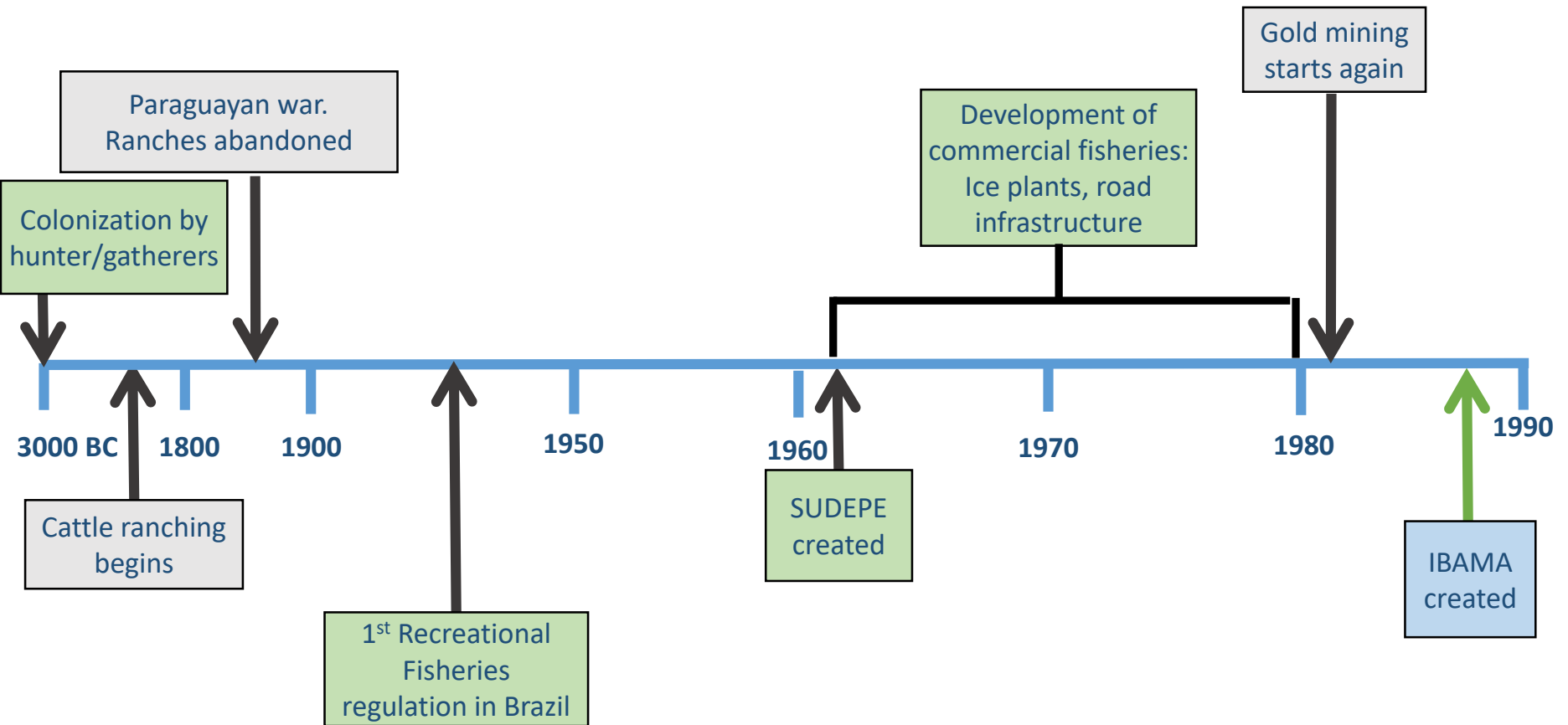
2016: 3 826 commercial fishers

1980s :~15 000 recreational fishers per year

Beginning of 1990s increasing until reaching a maximum of 59 000 in 1999

After restrictions, declined sharply to the current level of about 17 000

Timeline

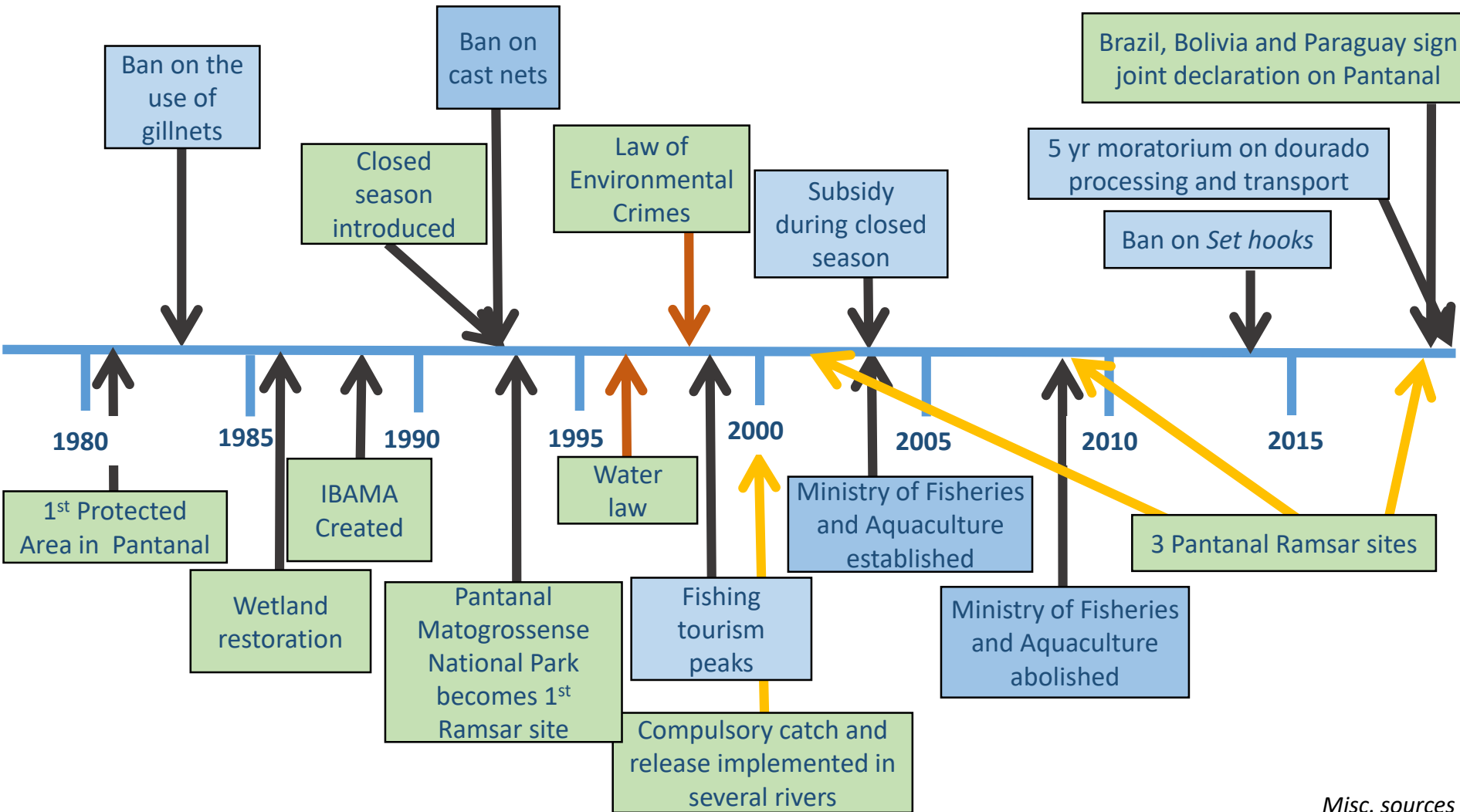


SUDEPE: Superintendence for Fisheries Development

IBAMA: Brazilian Institute of Environment and Renewable Natural Resources

Mostly:
Carolsfeld et al. 2003

Timeline



Misc. sources

EAF Principle	How it is being implemented
Good governance	There are elements of good governance in the legislation. However, at the local level top-down policies favour the recreational fisheries at the detriment of the artisanal sector.
Rights based fisheries management	Traditional rights based systems still exist in places in the Pantanal. However, these are not considered in the governance system, and do not apply to the recreational fisheries.
Community participation	The efforts to involve communities in decision making processes appear to be small and scattered.
Gender and equity	There is very little information about the involvement of women in the fisheries sector – except as bait fishers.
The precautionary principle	The legislation attempts to maximize size rather than maximum sustainable yield.
Sustainable resource utilization	Fisheries resources are very lightly exploited compared to other wetlands in the world.
Environmental protection	The Pantanal wetland itself remains in good shape, but is under pressure from pressures in the upper parts of the basin. Although environmental legislation is in place, large-projects remains a looming threat potentially reinforced by climate change.
User pays principle	Recreational and commercial fishing is licensed.



Regional perspective

- Since 2015, the governments of Bolivia, Brazil and Paraguay have been working on a transboundary effort called the Trinational Initiative for the Integrated and Sustainable Development of the Pantanal.
- This initiative seeks to reduce pollution, strengthen water governance and expand scientific knowledge on the Pantanal, while protecting the rights of traditional peoples.
- The three countries will help protect the regional biodiversity, ecosystem functions and the natural flow of the Paraguay River's tributaries.
- At the 8th World Water Forum in Brazil on March 22, 2018 the three countries signed a declaration for the conservation and sustainable development of the Pantanal.



Key messages of case study

- EAFM is a step by step process; apply lessons learned along the way
 - increasing stakeholder engagement
 - broadening scale and scope of management
 - built on existing fisheries management
 - strengthen governance
- Many fisheries in the world are doing EAFM in part;
- Each country is a different stage of the journey



Activity 1:

- Each group receives a card that displays one EAFM principle (some groups may have to consider two principles).
- In groups, discuss and score where you think your COUNTRY is along the continuum 0-5 for that principle.
- Using the lines set out on the floor, one representative for each principle paces out their score while holding the card.



Activity 2: In groups

1. Identify the **challenges** your country might face in moving towards EAFM
2. Write each challenge on a card. (**ONE** challenge per card)
3. Now identify **opportunities** your country may have in moving towards EAFM (and in meeting the above challenges).
4. Write each opportunity on a separate card