

Spatial Planning For Marine Aquaculture - Croatian Case

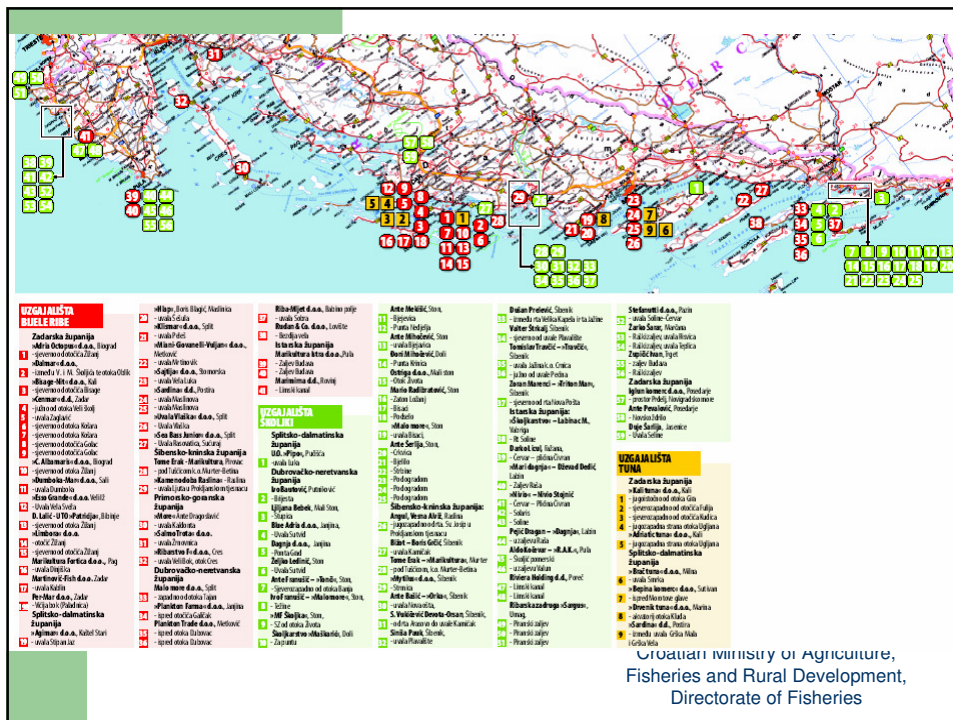
**GFCM - CAQ
WG on AZA
Sevilla, Spain, 2010**

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Marine Aquaculture sector in Croatia

- Sea bass and sea bream 5000 tons
- Mussels and oysters 2000 tons
- BFT 4000 tons

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AZA in Croatia – Physical plans

- 7 administrative regions (County) on coastline
- Physical plans have to define AZA
- Bylaw defining basic AZ criteria

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PARAMETER	GOOD	BAD
Exposure	Partially	Off shore/open sea
Depth	> 30 m	< 15 m
Currents	20-60 cm s ⁻¹	< 5 cm s ⁻¹
Water category	I	> I
Salinity (‰)	25-35	< 15 and > 40
Oxygen (%)	> 90	< 70
Trophic level	Oligotrophyc	Eutrophyc
Phytobentic communities	No phytobentic communities (seagrass meadows) or on safe distance determined by EIA	Seagrass communities

Criteria for white fish

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PARAMETER	GOOD	BAD
Exposure	Off shore/open sea	Coves/bays
Depth	> 50 m	< 50 m
Currents	> 10 cm s ⁻¹	< 10 cm s ⁻¹
Water category	I	> I
Salinity (‰)	36 - 39	< 36 and > 39
Oxygen (%)	> 90	< 90
Trophic level	Oligotrophyc	Eutrophyc
Phytobentic communities	No phytobentic communities (seagrass meadows) or on safe distance determined by EIA	Seagrass communities

Criteria for bluefin tuna

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AZA in Croatia – Location permit

- Location permit in line with physical plan
- EIA mandatory:
- Finfish farms located in a protected coastal area (within 300m from the coast) with annual production over 100 tons

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AZA in Croatia - EIA

- Fish farms located outside of a protected coastal area to a distance of 1Nm with annual production over 700 tons
- Fish farms outside the protected coastal area, which are distant from the coast of the island or the mainland for more than 1 Nm with annual production over than 3500 t

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AZA in Croatia - EIA

- Mariculture zone in protected coastal area planned for more marine finfish farms
- Shellfish farms in protected coastal area with annual production over 400 t
- Finfish farms in protected coastal area with annual production up to 100 t – the evaluation of the necessity of EIA

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AZA in Croatia - EIA

- Content of the study is prescribed by bylaw
- Study defines maximum production quantity regarding species, technology and site specifics
- Public hearing

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AZA in Croatia - EIA

- Study defines monitoring procedures
- Monitoring is obligated
- But - indicators and monitoring parameters are not defined!

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AZA in Croatia - concession

- County gives concession based on location permit
- Maximum period up to 20 years
- Concession can not be extended except in special cases with agreement of government

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Legislative framework

- Physical Planning and Construction Law
- Environmental protection Law
- Maritime Law
- Marine Fisheries Law

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Institutions involved

- Ministry of Agriculture, Fisheries and Rural Development
- Ministry of Environmental Protection, Physical Planning and Construction
- Ministry of Sea, Transport and Infrastructure
- County
- Government

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Interaction with other users

- Tourism
- Fisheries
- Navigation
- Waste waters
- Ports

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Opportunities – ICM?

- ICM gives information (scientifically based, relevant, easily accessible, transparent, etc) for decision makers regarding specific coastal area:
 - Suitability
 - Capacity
 - Possible conflicts

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Opportunities – ICM?

Information includes:

- Resource – geographical description, physical, chemical, geological data
- Activity – characteristics, inter activities possible conflicts

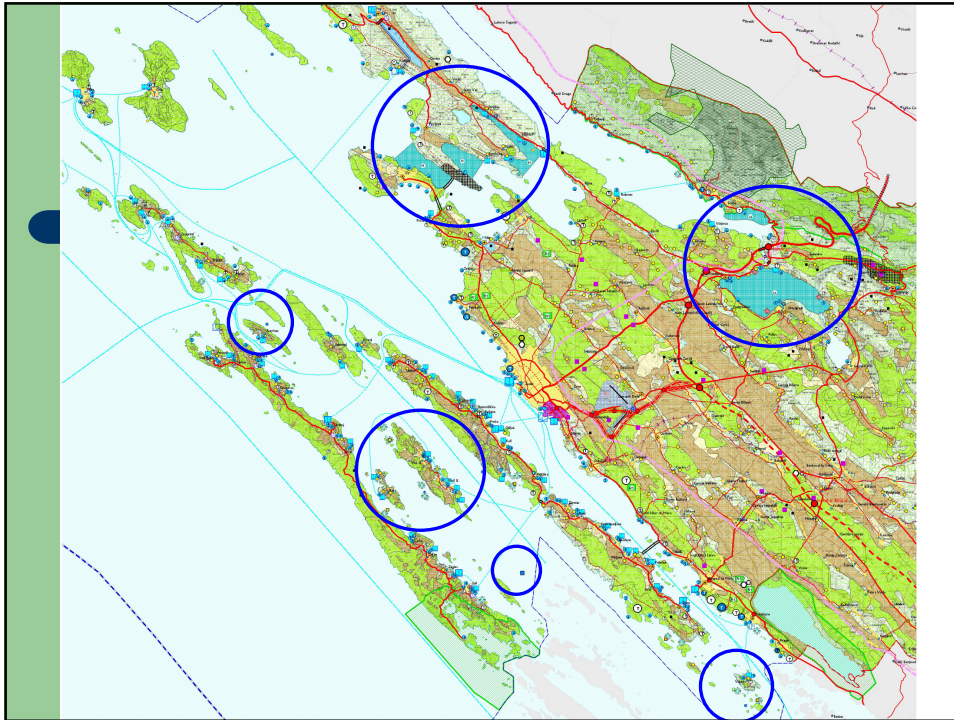
In practice in Zadar County

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ICM - ZADAR COUNTY

- More than 50 % of Croatian marine aquaculture
- Coastal zone the most important developing resource
- First symptoms of degradation due to the lack of integrated management
- Aquaculture Zonation based on ICM principles – Z1, Z2, Z3, Z4

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ICM - ZADAR COUNTY

MONITORING - WATER COLUMN:

- General indicators: cloudiness, wind speed and direction, air temperature, sea temperature, waves, sea color, odor, transparency, floating wastes, solid wastes, visible fats and oils

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ICM - ZADAR COUNTY

MONITORING - WATER COLUMN:

- Physical - chemical parameters: salinity, density, suspended solids, dissolved oxygen, oxygen saturation, BOD5, ammonia, nitrates, nitrites, total nitrogen, total phosphorus, total fat and mineral oils

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ICM - ZADAR COUNTY

MONITORING - WATER COLUMN:

- Microbiological parameters: aerobic mesophilic bacteria, intestinal enterococci, E. coli
- Biological Indicators: chlorophyll a

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ICM - ZADAR COUNTY

MONITORING - SEDIMENT:

- Physical - chemical parameters: total nitrogen, total phosphorus, organic phosphorus, total organic carbon, redox potential, granulometry

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EXPERIENCE

- 4 years in practice
- Expensive, complex but optimal technical framework for AZA if applied properly
- Personal awareness is key factor!

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Thank you for your attention!

