

ShARed GOVERNance

of Sustainable fisheries and aquaculture activities

as leverage to protect marine resources in the Adriatic sea

WP3– Governance framework

D3.1.3 Application document

Analysis of interactions between different typologies of aquaculture practices and the trends of Adriatic fish stocks, highlighting both positive and unwanted effects of aquaculture on marine habitats and species;

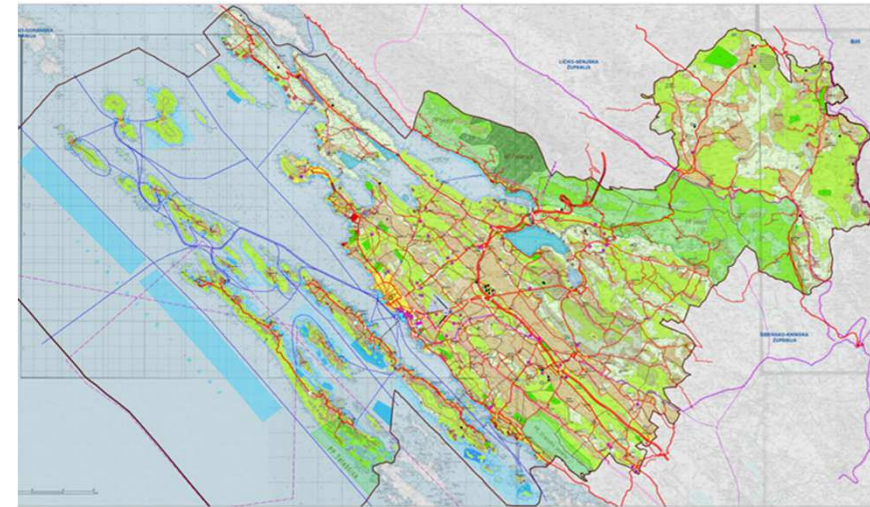
Zadar county

Case study- Zadar county

Why?

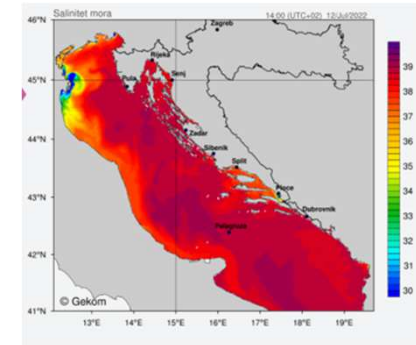
Experience in governance with many lessons learned

- 2003. – Study – Integral coastal zone management (ICZM) for aquaculture with elements of marine spatial planning
- 2004. – Allocated zones for aquaculture (AZA) were defined in the County spatial plan
- The permit for fish farming is preceded by an environmental impact assessment
- From 2009. - Marine environmental quality -monitoring program includes all economic activities with a marine environment footprint
- Since the launch of ICZM, finfish farming increased + 400% and shellfish farming has been started



ANALYSIS OF THE RELATIONSHIP BETWEEN DIFFERENT FORMS OF AQUACULTURE AND TRENDS IN FISH STOCKS IN THE ADRIATIC SEA

- ENVIROMENTAL, HUMANS'S AND ANIMAL INFLUENCE ON FARMS
- GENERAL ABIOTIC AND BIOTIC FACTORS AFFECTING FISH AND SHELLFISH FARMING (temperature-warming...) (salinity, oxygen...) (lightning storms...)
- Biotic Factors:
 - i. Gathering of predators in AZA - damage and stress (birds, bluefish, tuna, sharks, dolphins, gilthead bream, starfish)
 - ii. Fouling
 - iii. Primary production, plankton -> shellfish feeding
 - iv. Diseases



Additional aspects

Anthropogenic impact on the environment and aquaculture

- Nautical tourism – fecal pollution
- Natura 2000
- Discharges of wastewater
- Noise
- Stress caused by technological processes in cultivation and by educational and tourist activities on farms

The impact of AZA on the environment, people and other living beings

- Emission of chemical compounds, energy and living organisms
- Visual – aesthetic impact
- Impact on marine traffic
- Exclusion of the sea area - for other activities
- Barrier for sea currents
- Shading the seabed – impact on marine phanerogams
- Creation of new habitat - Fouling community
- Solid and liquid waste
- Release of microplastics
- Release of drugs (antibiotics..), washing and disinfecting agents
- Oxygen consumption
- Release of plant nutrients (fertilizers) – eutrophication
- Fish escape from aquaculture facilities impact on genetic diversity of wild populations
- Behavior change of predatory species
- Risks of shellfish consumption for humans – toxins/ microorganisms

MEASURES AND RECOMMENDATIONS

- With the establishment of AZA, aquaculture becomes a long-term activity
- AZA is therefore a new limited but anthropogenic ecosystem
- Therefore, it is not logical to expect the absence of a measurable impact of the established activity in AZA
- However, it is necessary to establish criteria - indicators - for sustainable aquaculture
- Besides the environmental and the precautionary approach, the acceptability of farming is significantly determined by the ecosystem services provided and should be a constituent part of the validation procedure
- Besides precautionary principle it is necessary to evaluate the opportunities and strengths given by the establishment of a new aquaculture ecosystem

RECOMMENDATIONS

Finfish aquaculture

Interaction with species in the environment

- Establishment of data collection (biotic and abiotic) on the „aquaculture ecosystem”
- Recognition of public or special interest in species that aggregate around the farm
- Supplementing a legislative framework that allows the use of potential services provided by fish farms by establishing habitats for the species in the environment.
- Monitoring of the presence of microorganisms and parasites in the species of organisms that aggregate in the area of the farm.
- Investments in measures against bird attacks

RECOMMENDATIONS

Finfish aquaculture

Interaction with catches of the same species in fisheries

- Market interaction - product traceability and declaration should provide information about the product, including its origin.
- The interaction in the environment – establishment of administrative, technical and technological safety mechanisms

Interaction with habitat

- Aquaculture management encompasses the care of all processes that take place in the farming ecosystem, and management recognizes a new desirable balance of the ecosystem in which the long-term sustainability of the activity should be ensured

RECOMMENDATIONS

Shellfish aquaculture

Interaction with species in the environment

- Interaction with species in the environment may also have special cases that occur when shellfish are transferred from one production area to another.
- It is necessary to regulate the transfer of shellfish between production areas for which a direct connection of their water masses cannot be established.
- Establishment of systematic monitoring of the shellfish health in the wider zone around AZA

Interaction with natural shellfish habitat

- Important to preserve the reproductive potential of the species exploited through farming and harvesting
- Establish zones of prohibition of shellfish collection from natural habitat