

# WG 8 - FISHES



*Arapaima* spp./Brazil



*Anguilla anguilla*/Sweden



*Hippocampus* spp.



*Cheilinus undulatus*/Indonesia



Sturgeon/NW Black Sea and Lower Danube

dans le lac Washington  
près de Seattle, en novembre  
1987. Selon les habitants  
Pohénégamak, le monstre  
du lac lui ressemblerait  
en plus gros



sharks

# Assumptions:

- Fisheries management has a long history
- Many training manuals, databases, etc.
- Fishes listed on Appendix II are vulnerable and trade is an important threat
- More uncertainty, more caution, more monitoring
- Experts, who know fisheries, are available to Scientific Authority

# Vulnerability

- Biological characteristics leading to greater vulnerability included a longer life span, later sexual maturation, slower growth and lower natural mortality
- Specialists versus generalists
- Marine species cannot be considered less vulnerable on the basis of biological attributes such as high fecundity or large-scale dispersal characteristics
- Reasons: 1) exploitation, 2) habitat loss

Does trade involve take of wild animals?  
Effective management in place? →if yes base NDF on existing plan

NO

Do we have sufficient information to consider detriment? (See priority elements in [Table 1](#))

NO

Fill the gaps (See methods in [Table 2](#))

Re-assess

YES

Set **precautionary** measures – appropriate to level of uncertainty (input and/or output management controls, See [Table 3](#))

**NDF** based on measures  
Could be YES or NO

Adaptive management

Monitor to assess the effect of current measures on population status (see [Table 4](#))  
Level/frequency of monitoring depends on life history, level of interaction and level of uncertainty (See [Table 5](#))

Evaluate sufficiency of measures (based on pop response) and adjust

**Population status**

# Recommendations

- **Must consider all sources of significant mortality** - consider whether quota is enough to achieve conservation goals
- **Collaboration between Scientific Authorities and fisheries experts**
- **Transboundary migrants and shared stocks require regional NDF cooperation**
  
- Be cautious with fisheries dependent data, verify when possible
- When possible, base NDF on both fisheries independent and dependent information/data
- Need techniques and legislation to distinguish among farmed, captive bred and wild individuals
  
- Management on which NDF is based should employ principles of adaptive and participatory management
- Parties need to report to Secretariat methods by which NDFs are being made on an annual basis

# Thanks



# Table 1 – Biological characteristics/ Harvest/ Other Impacts

Information needed	For what
which species	taxonomy
where (locations, depth, habitat)	spatial distribution; habitats
when (time of year)	temporal distribution
how many	abundance (preferably over time)
size/age structure	size/age distribution; growth; mortality
sex (male, female, juvenile)	sex ratio
mature (yes/no)	size/age at maturity; maturity schedule
all significant sources of mortality	make NDF in context

Mortality: (legal and illegal) direct take, bycatch, non-harvest related mortality

Other Impacts: habitat degradation and loss



# Table 2 – Methods/Tools

Biological and species status data	Possible methodologies
<i>Taxonomy and life history</i>	DNA sampling Voucher (museum) specimens Ageing methods Age and growth models Visual inspection Gonad sampling Measuring/weighing Life stage characterization Info on similar species Mark re-capture
<i>Abundance and distribution (spatial/temporal approach)</i>	Fisheries dependent sampling (CPUE) Visual surveys Recruitment indices Mark-recapture Interviews Fisheries independent sampling (See monitoring methods)
<i>Population structure (spatial/temporal approach)</i>	Length frequency analysis Age frequency analysis Catch curve analysis Genetic analysis (metapopulations structure) Sex ratio analysis
<i>Habitat and other impacts</i>	GIS Remote sensing Visual surveys Substrate sampling Sonar Water quality assessment Temperature, salinity, turbidity assessment Ecosystem assessment
<b>Harvesting and trade data</b>	Catch (port sampling, observers, trade data) Effort Market sampling Interviews Rapid Rural Appraisals Genetic analysis Catch and trade document schemes Dock-side sampling Databases Harmonised Systems (HS) codes (WTO customs codes)



# References/ Resources

- Inter-governmental/ regional fisheries bodies to assist countries with fisheries management
  - IUCN Specialist Groups
  - FAO
  - SPC
- Many reference books/ manuals on methods, models, etc.
  - E.g. [Hippocampusinfo.org](http://Hippocampusinfo.org), [Fishbase.org](http://Fishbase.org)



# Table 3 – Management measures

<b>Management and conservation measures</b>
Quotas
Size limits
Gear restrictions
Seasonal closures
Spatial closures
Rights-based management (e.g. licensing)
Community-based management
Capacity building
Environmental education
Product form regulations (e.g. whole shells or animal)
Transport regulations (e.g. hhw shipped alone and by air)
Labelling/certification
Bag limits
Management history (formal and informal)

**Should consider both input and output controls, as appropriate**  
**Note that in most cases a quota alone will not achieve conservation goals**

# ESTIMATING SUSTAINABLE QUOTAS: IS IT ENOUGH FOR A FISH NDF?

- Setting quotas is the most direct way to manage fishing mortality
- BUT it requires accurate estimates of catches and stock size
- High risk of overfishing due to uncertainties
  
- Quotas should be combined with other precautionary measures, such as:
  - effort control (limited entry)
  - minimum size
  - gear restrictions (control the use of destructive gears)
  - protected areas
  
- To be effective, a management system must be in place:
  - Monitoring
  - Enforcement (reducing IUU fishing)
  - Adequate policies and incentives for sustainable use



# Table 4 – Monitoring and data integration

## **Monitoring**

Population monitoring

Harvest monitoring

Trade (domestic and international) monitoring

Compliance assessment

Ecosystem assessment

Participatory monitoring

## **Data integration for NDF elaboration**

Analyse time trends

Stock assessment methods

Analyse spatial patterns

Demographic analyses (e.g. life tables, matrix methods, etc.)

Rapid assessment methods



# Table 5 – Assessing quality

An example: assessing quality of abundance estimates FAO Fish. Rep. 833 (2007)

Reliability index of population abundance information	Source of data or information
5	Statistically designed, fishery-independent survey of abundance.
4	Consistent and/or standardized catch-per-unit effort data from the fishery.
3	Unstandardized catch-per-unit effort data from the fishery; scientifically-designed, structured interviews; well-specified and consistent anecdotal information on major changes from representative samples of stakeholders.
2	Catch or trade data without information on effort.
1	Confirmed visual observations; anecdotal impressions.
0	Information that does not meet any of the above, or equivalent, criteria; flawed analysis or interpretation of trends.

- peer review
- stakeholder consultation
- public communication
- regional consultation/agreement
- statistical methods (from standard deviations to power analyses to Bayesian methods)

TRANSPARENCY of process



# Talking pts

- Input versus output
- Level of monitoring – depends on:
  - Life history
  - Level of interaction versus cost – e.g. low catches in bycatch fishery – fisheries independent surveys more appropriate than observer coverage
  - Level of uncertainty
  - Whose responsible for data collection? Who bears the burden of proof?
  - Existence of organisations to assist countries get it right