

Biodiversity conservation: the role of the YSLME

- Brief Review
- Topics for discussion
- What is required
 - Gene pool analysis
 - Gene bank
 - Survey - Species or Genetic diversity
- Agreement on who is responsible for what actions



Review

- Won Kim
 - reviewed sp richness and genetic diversity
 - techniques - use in taxonomy
 - micro satellite markers
- Lingling Qu
 - reviewed techniques microbial genetics and outlined the benefits of studying GD, presented database
- Hye-Sook An
 - micro satellites
 - 11 abalone pop (Wild vs Hatchery Raised HR)
 - Rock Bream in 3 sites.
 - Pacific sand eel in ROK
 - Effect of restocking prog on FW fish



- Linsheng Song
 - genetic component of disease in scallops
 - overview of GD studies in other sp.
- Jeong-Ho Lee
 - microsatellite in Korean Olive flounder
 - HR loss of alleles, decr allele freq
- Lingling Wang
 - inbreeding index HR vs *W. C. farreri* in Dalian—nd
 - Gen differentiation between C.f from J, C & K
 - depression in GD in *A. irradians* in HR stocks
 - still no sig diff between HR and *W. C.f* and *A.i*
- Yong-Jin Won
 - mtDNA in marine *Batillaria* snail showed W.Jeju and YS pop
 - coral mDNA – very slow evolution – thus barcoding needs other genetic markers



- Shicui Zhang –
 - Amphioxus simple genome and key molecules involved in adaptive immunity – evolution immune defense
- Choong-Gon Kim
 - DNA barcoding & DNA chip technology to separate skate sp (similar morphology among sp and variability within sp) & other sp including sponges
- Xianhong Meng
 - 7 population of *F. chinensis* using microsatellite
 - 4 pops
 - review of genebank database
- Jang-Seu Ki
 - Phylogenetic comp of mtDNA sequence found moon jelly same as *Aurelia* sp1, clustered with *A. limbata* not *A. aurita*
 - DNA chip development using CO1mtDNA to discriminate betw sp.

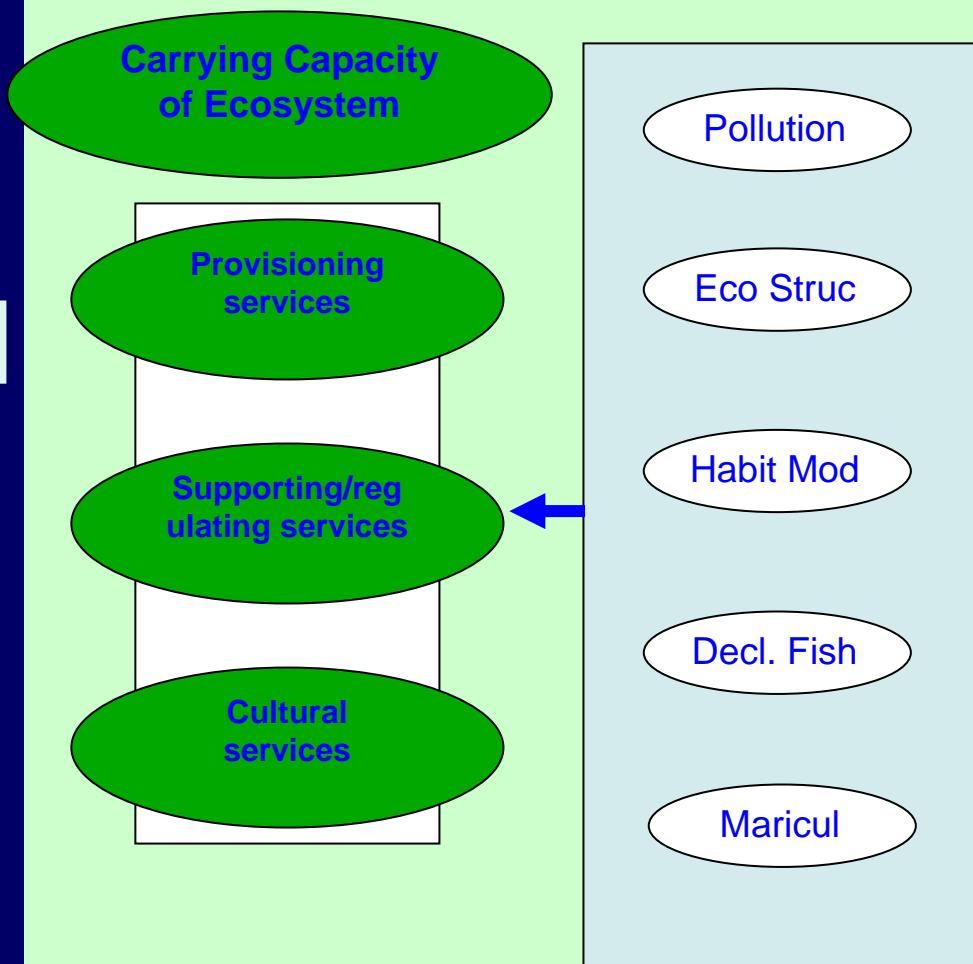


UNDP/GEF YSLME Project

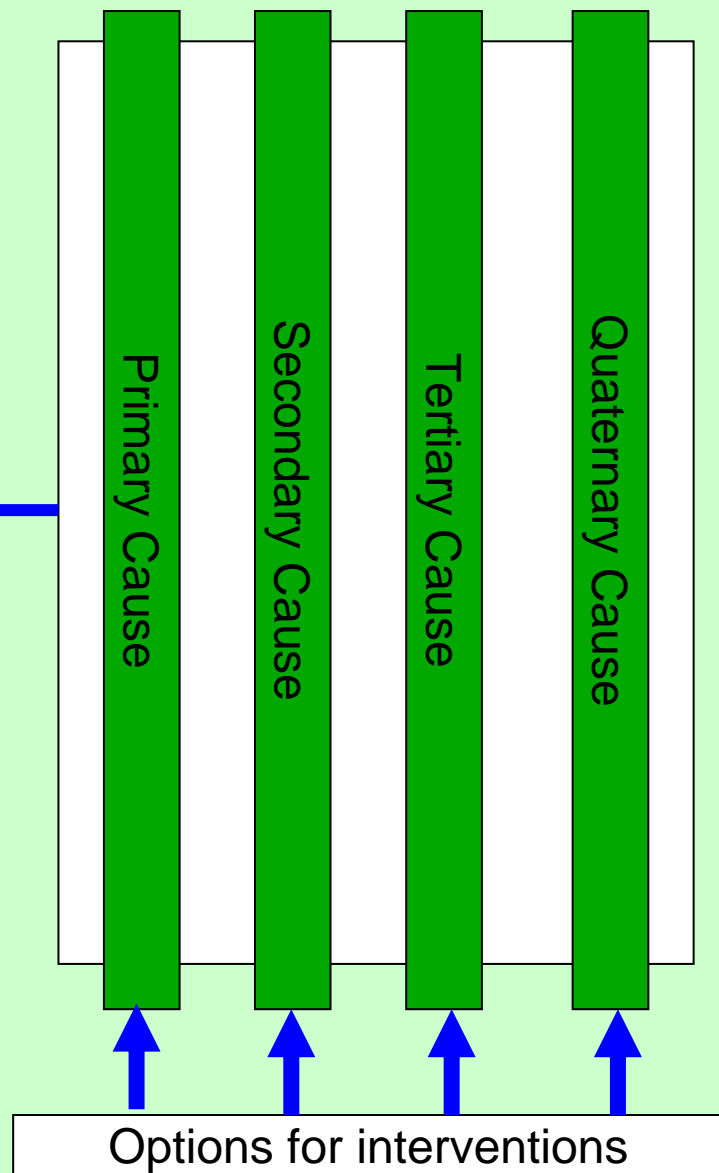
- Data & Info collection in 5 components & CCA
 - TDA
 - Ad hoc – Ecosystem Quality Objectives
 - Ad hoc – management actions
 - SAP



Identified Environ Problems



Causal Chain Analyses



Applied Ecology – Conservation Biology

adapted from a presentation by CJ Krebs

Principles relevant to YSLME project:

- Protect biodiversity (Sp rich/comp/vuln/struct sp.?)
- Protect genetic diversity/variance
- Protect natural habitat
- Provide dispersal corridors

Caughley, G., and A. Gunn. 1996. Conservation Biology in Theory and Practice. Blackwell Science, Oxford. 459 pp.



Ecological Theory – Community Dynamics

Diversity and Stability Hypothesis

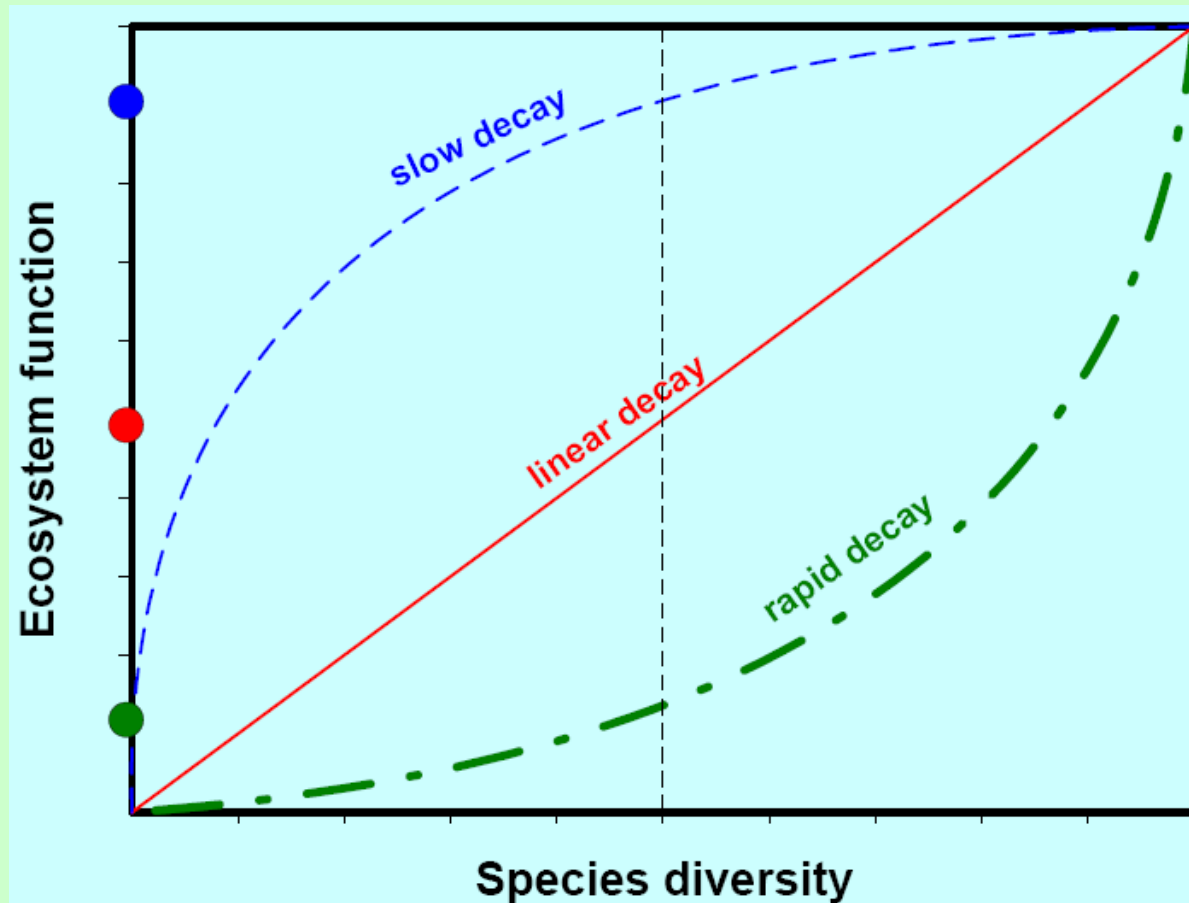
- High biodiversity = high stability
- High biodiversity = high productivity
- Monocultures lead to pest and disease outbreaks
- Products for human health
- Unknown amount of redundancy

McCann, K. S. 2000. The diversity-stability debate. *Nature* 405: 228-233.

Worm, B., and J. E. Duffy. 2003. Biodiversity, productivity and stability in real food webs. *Trends in Ecology & Evolution* 18: 628-632.



Ecosystem Function in relation to Biodiversity

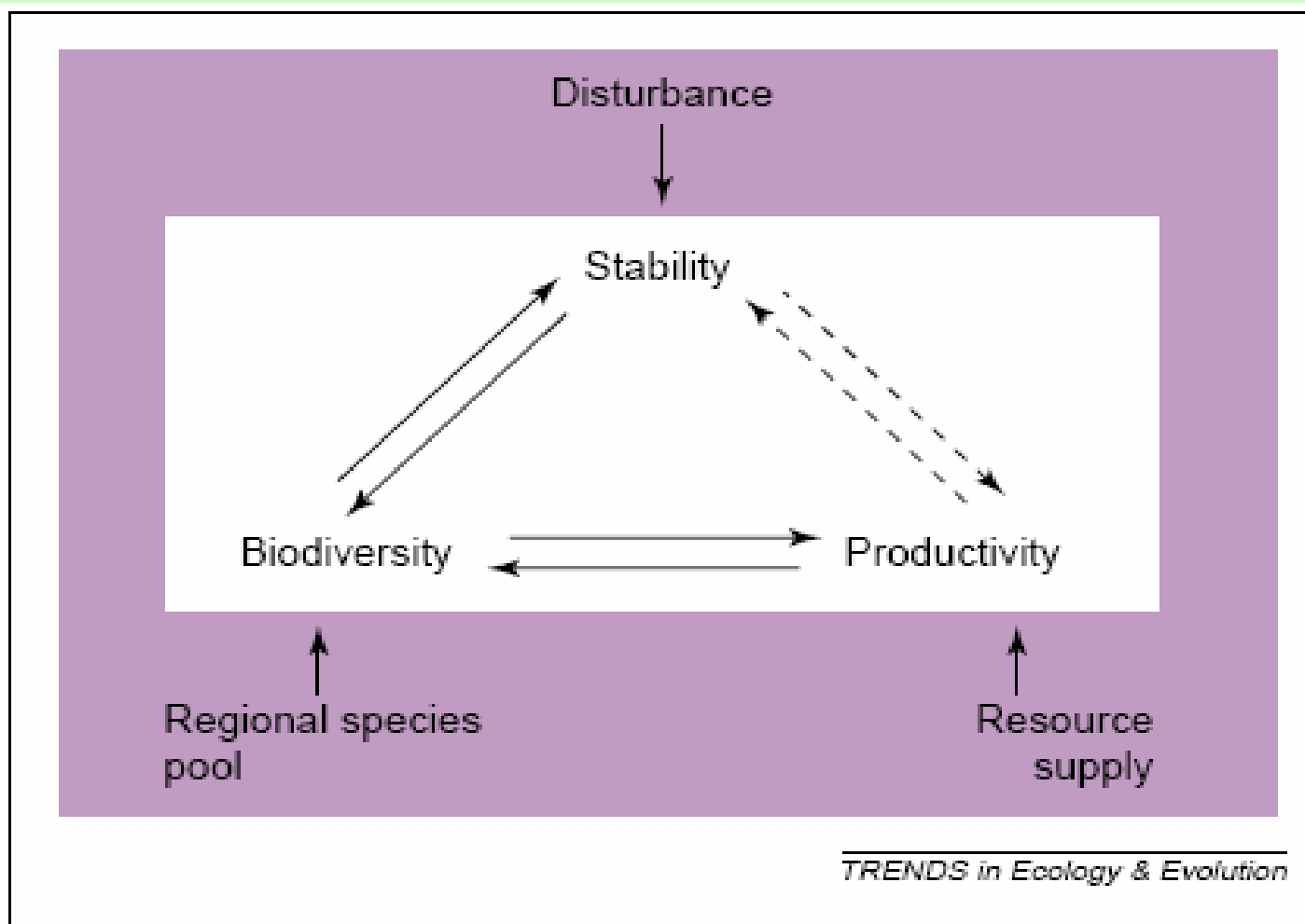


McCann, K.S. 2000. The diversity-stability debate. Nature 405: 228-233.



Ecological Theory – Community Dynamics

- Food web interactions



Worm, B., and J. E. Duffy. 2003. Biodiversity, productivity and stability in real food webs. *Trends in Ecology & Evolution* 18: 628-632.



A Potential Conflict

- Conservation biologists - rare species
 - Agricultural scientists - common species
- consider indiv. species with regard to system function

Balvanera, P. et al. 2005. Applying community structure analysis to ecosystem function: examples from pollination and carbon storage. *Ecological Applications* 15:360-375.



Applied Ecology – Conservation Biology

Why protect genetic diversity?

- Future evolution potential
- Protect local ecotypes
- Unknown amount of climate/environmental change
- Ignorance is not bliss

Joshi, J. et al. 2001. Local adaptation enhances performance of common plant species. *Ecology Letters* 4: 536-544.



The CBD (UNEP) identifies the protection of biodiversity as one of the “Focal Areas”.

Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes

- Target 1.1: > 10% ecological regions conserved.
- Target 1.2: Protection of Important Areas to Biodiversity

Goal 2. Promote the conservation of species diversity

- Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups
- Target 2.2: Status of threatened species improved.

Goal 3. Promote the conservation of genetic diversity

- Target 3.1: Genetic diversity of species conserved, and associated indigenous and local knowledge maintained.



Article 8 – *in situ*

- sustainable use of resources;
- environmentally sound development;
- eradication of introduced species;
- preservation of ecosystems and important habitats;
- protected areas and
- rehabilitation of degraded areas.



Article 9 – *ex situ*

- establishment and maintenance of facilities for ex-situ conservation of and research on plants, animals and micro-organisms, preferably in the country of origin of genetic resources.



Objectives for YSLME

- Why is genetic diversity important for the Yellow Sea;
- Stresses on genetic diversity/variance? (the genetic separation of stocks of exploited species, the transport of genetically different stocks from one area to another for culture);
- Management measures needed to sustain genetic diversity in the YS: –
 - gene- or germplasm bank?
 - database of Yellow Sea genetic information (gene sequences)?
 - essential areas/communities/species for genetic diversity?
- Current status of gene-pool info. and research activities of both countries;
- Problems and gaps of understandings and knowledge in two countries; and
- Activities for gene-pool preparation in the participating countries.



Budget

- Biodiversity advisorUSD 25,000
- Biodiversity and ConservationUSD 75,000



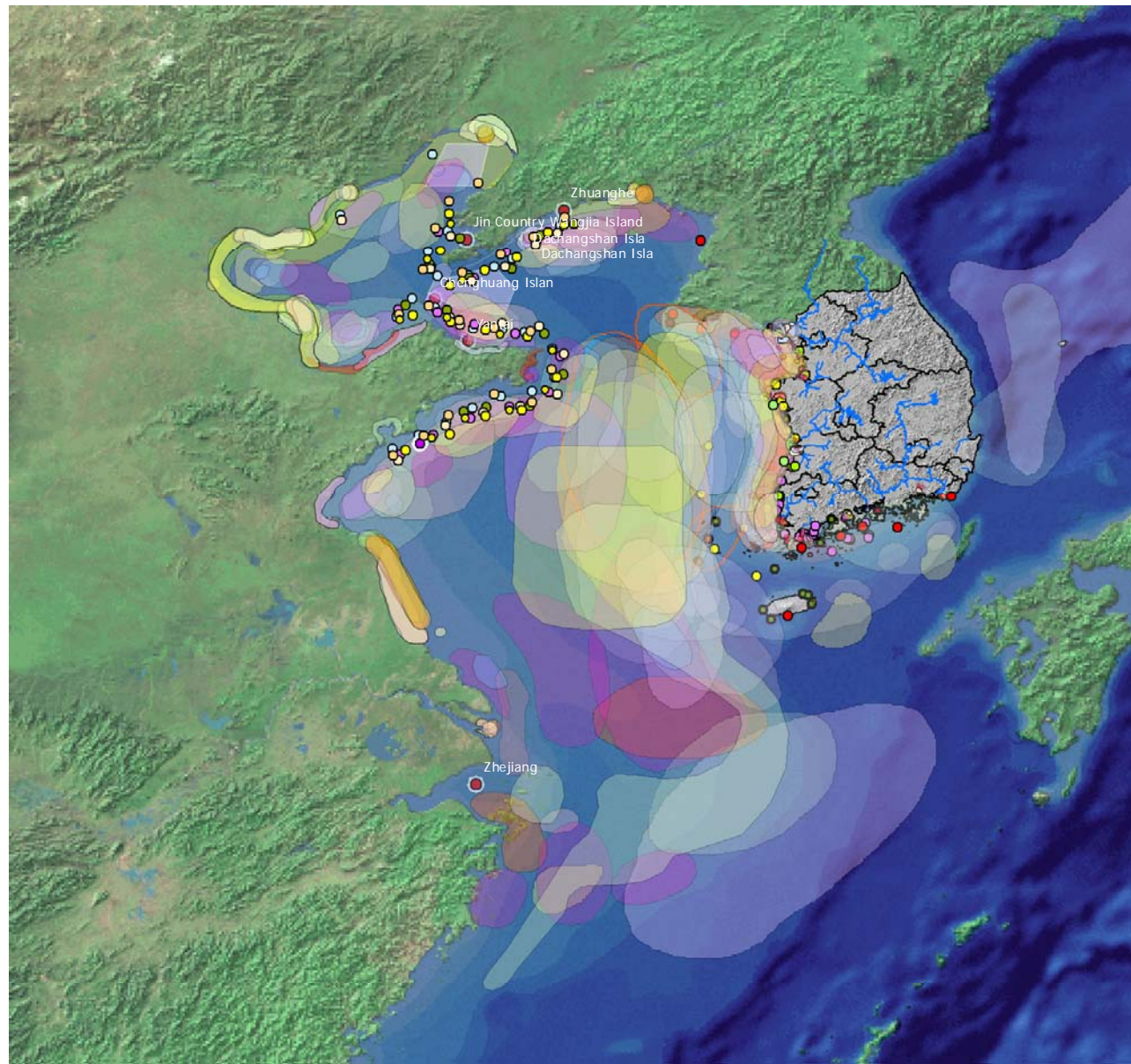
Ideas

- Identification of Critical habitats



Biodiversity: Protection of critical habitats

Priority
Protected
Areas



Ideas

- Identification of genetic diversity stress
- Relationship of GB and policy for management
- Identification of critical habitats
- Genetic diversity/variance or species diversity
- Genetic diversity/variance hotspots?
- Genetic database or gene/germplasm-bank?



Cont'd

- Database gene/germplasm bank contribution to regional ecological targets?
- Host organisation (micro/macro) – linkage/language?



Thank You

