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21세기 프론티어연구개발사업
수자원의 지속적 확보기술개발 사업
(SUSTAINABLE WATER RESOURCES RESEARCH)

【 발표 4 】

댐개발사업시 적용가능한 서식지평가기법 연구

Ecological Impact Assessment and New Trends of Ecosystem Approach in Japan

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Ecological impact assessment and new trends of ecosystem approach in Japan

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Limitations of traditional EIA systems in ecosystem conservation

Environmental Impact Assessment in Japan, particularly ecological impact assessment, is changing as a result of the 1997 EIA law which came into force in 1999 and, more importantly, because of accumulated questions raised by traditional ecological assessment systems. Before the EIA law enforcement, the National 1984 Administrative Order on EIA system had been considered the standard EIA procedure in Japan. I would like to draw attention to two particular problems with the 1984 order.

First, generally speaking, when environmental impacts are problems, mitigation measures should be solutions. Thus mitigation should be considered as a sequel to an EIA study. However, neither the definition nor importance of mitigation was clearly regulated in the 1984 order. Proposed mitigation measures in EISs were not meaningful, nor were they in any way comprehensive they were there in name only. Therefore little improvement of a proposed development plan could be expected. Consequently EIA has been considered simply as a cost for developers, a name only for environmentalists, and a task which consultants conducting EIA studies carried out with something of a guilty conscience. This is the primary problem of traditional EIA systems in Japan.

Secondly, under the traditional 1984 EIA orders, ecosystems did not have to be studied as parts of EISs. Only flora and fauna - that is inventories of identified species were included in the EISs. The reason was because quantitative assessment methods for ecosystems had not been developed although many people were aware of the importance of ecosystem approaches at that time. Consequently, inventories of important species were described in EISs and developers and consultants tried only to relocate these species rather than protect the habitats.

When important species were identified through EIA surveys, typical excuses described in EISs were that since there were many other habitats for the species around the proposed development site, there was no significant

impacts on the species; or, since the identified plants/animals would be transplanted to adjacent areas, there was no impacts. But, developers do not have any responsibilities to protect adjacent areas and these areas are going to be developed by another developer sooner or later.

In short, traditional EIA has not been effective in conserving natural ecosystems and as a result natural ecosystems have continuously been destroyed (Tanaka, 1996). One of the main reasons for this has been the lack of provision for compensatory mitigation measures.

New trends and current two major issues of ecological impact assessment

In the 1997 EIA law, the importance of ecological mitigation proposals in EISs is clearly expressed and a concept of compensatory mitigation is also introduced. In addition to flora and fauna in traditional EIA systems, ecosystems became a part of EIA studies and of EISs.

Ecological mitigation measures should be proposed firstly to avoid impacts, secondly to minimize impacts and finally compensate for impacts. When a development project is inevitable, loss of both the areas and functions of the ecosystems on the development site is inevitable, too. Therefore compensatory mitigation measures are essential as a part of the conditions under which a proposed development is allowed to go ahead. The purpose of ecological compensatory mitigation is to compensate the loss of habitats that will be destroyed by development projects by a process of restoring/creating/enhancing/preserving habitats. Based on the above circumstances, there are three major issues for future ecological assessment in Japan. That is development of guidelines for compensatory mitigation and development of the quantitative ecological assessment tools.

Development of guidelines for compensatory mitigation

According to the 1997 EIA law, compensatory mitigation can be introduced when it is considered necessary. This is a problem. Because the law is applied only to large-scale national projects, most if not all of these projects must have significant impacts on ecosystems. However, some projects implemented by local governments and the private sector may have significant impacts on the environment, and the national law cannot be applied to them. (Most prefectures have their own EIA regulations to cover non-national projects.) It is rational to suppose that there will be some impacts on local ecosystems, as long as the proposed national project is permitted. Very seldom has No action been applied to national projects. Therefore compensatory mitigation should be obligation as

long as proposed project is permitted. The magnitude and type of compensatory mitigation activity should be discussed in terms of the circumstances.

There are a multitude of things we need to do to improve our ecosystem management and control of development projects, including EIA systems. Here I would like to discuss these from the point of view of both the project proponent and of environmental policy and administration.

For project proponent, it is desirable that loss (i.e. impacts) and gain (i.e. mitigation) be described in at least one-to-one ratio in EISs. Both impacts and mitigation should be quantitative. Details of analyses on sequencing of avoidance-minimization-compensation must be clearly described in EISs to make sure reason the reasons why the proposed compensatory mitigation is necessary. It is also essential to make an explicit distinction in the EISs between compensatory mitigation projects that correlate directory with adverse impacts and other voluntary restoration/creation activities

For policies/administration sides, guidelines that describe the principles of ecological mitigation proposals such as sequencing of avoidance-minimization-compensation must be prepared to avoid excuse type compensation. Technical manuals that include quantitative ecosystem evaluation methods such as HEP must be promoted to introduce and publicize the various existing quantitative techniques into Japan. Both national and local governments must prepare quantitative goals of ecosystem management such as no net loss policies, to promote substantial ecological restoration and creation projects. Primary zoning for ecosystem preservation must be introduced to reduce primitive conflicts between proposed development and conservation in the area that should be preserved. Ecological restoration and creation technologies and related industries must be supported to reduce costs of compensatory mitigation and to improve capacity buildings in this fields. Relationships between land-use-planning and environmental impact assessment must be strengthen to ease the siting of compensatory mitigation. Introducing win-win systems such as mitigation banking must be considered to reduce the burden of compensatory mitigation on project proponents.

Development of the quantitative ecological assessment tools

Making inventories of flora and fauna is not enough to protect them. It is essential to secure substantial habitats in space and time. While some compensatory mitigation measures have been proposed in Japan, there has been no quantitative analysis for ecosystem assessment. It is time to progress in ecological assessment by moving from the traditional qualitative species approach towards a quantitative ecosystem approach.

Habitat Evaluation Procedure (HEP) is one of the most holistic approaches

of ecological assessment, which satisfies all requirements mentioned above. HEP evolved from an assessment method developed in Missouri in 1974 and it has been modified in several times by U.S. Fish and Wildlife Services.

HEP is a species-habitat approach to ecosystem assessment, and habitat quality for selected evaluation species is documented with an index, the Habitat Unit (HU). The HU derived from quality of habitat, which in turn is defined by a Habitat Suitability Index (HSI) and the total area of available habitat as the index of quantity. The value of HSI, which ranges form 0.0 to 1.0, is derived from an evaluation of the ability of key habitat components to supply the life requirements of selected species of fish and wildlife. (U.S. Fish and Wildlife Services, 1980) Using HEP, not only loss of habitats (i.e. impacts) but also gain of habitats (i.e. compensatory mitigation) can be evaluated both qualitatively and quantitatively.

Figure showed a conceptual diagram of HEP. The left-hand part of the figure shows changes in HU at hypothetical development site for waste dumping while the right-hand part shows changes in HU at a compensatory mitigation site (i.e. restoration site) adjacent to the development site. PA1, PA2 and MP1, MP2 are HU of each year. For example, HUs of PA2 reduced sharply because of deforestation and excavation of pit for waste dumping. When filled to capacity, PA2 rise sharply because the surface is covered by topsoil and revegetated during a concentration maintenance period. After the maintenance period, PA2 rise gradually as the nature recovered naturally. We can define quantities of both net loss and net gain by subtracting HU values of without project from HU values of with project. In conclusion, HEP allows us to review the balance between impacts and compensatory mitigation measures.

HEP is considered the most comprehensive one among more than 200 ecosystem evaluation methods created in the United States. The species-habitat approach used in HEP is basically same approach as the ecosystem assessment method proposed in EIA techniques in biodiversity conservation II - Process of ecosystem assessment (Environment Agency, 1999), which is considered the technical manual of ecosystem assessment in Japan. The principles of HEP and the individual cases are very relevant for promoting ecosystem assessment process in Japan.

Conclusion

Finally, we should not forget that we can avoid ecologically not sound development projects by identifying quantitative information about compensatory mitigation projects which developers owe. If identified obligation about the compensatory mitigation is too big scale or too difficult, project proponent will surely give up the proposed development project. For this reason, obligation about compensatory mitigation must be explicitly described in EIA guidelines and

quantitative ecological impact assessment tools which can evaluate both impacts and mitigation are very essential.

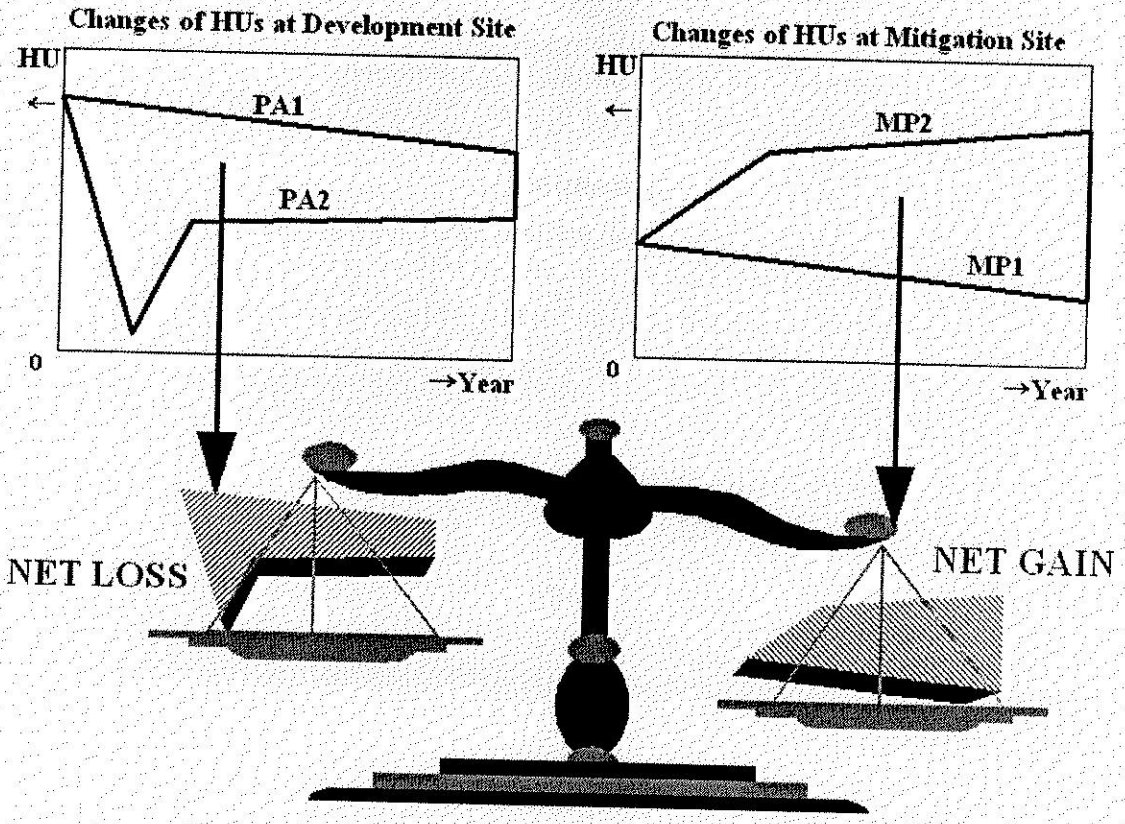
Literature sited

U.S. Fish and Wildlife Services, Ecological Services Manuals, ESM 101, 102 and 103, Department of the Interior, Washington, D.C., 1980

Environment Agency, EIA techniques in biodiversity conservation II - Process of ecosystem assessment, as an interim report of national EIA advisory committee in biodiversity conservation, Tokyo, 1999

Key word

Habitat approach, Compensatory mitigation, Habitat Evaluation Procedure (HEP), Net gain, Net loss, No net loss



Legend

PA1: HUs of Development Site without Development
PA2: HUs of Development Site with Development
MP1: HUs of Mitigation Site without Development
MP2: HUs of Mitigation Site with Development

Figure Conceptual Diagram of HEP