

MARKET-ORIENTED NATURE CONSERVATION IN THE CONTEXT OF IMPACT REGULATION – A NEW INSTITUTIONAL ECONOMICS PERSPECTIVE

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Impact regulation in Germany and the United States

In Germany in the last 60 years there has been more than a doubling of land that has been converted into areas of human settlement and transport infrastructure (Wiggering et al. 2009). This is equivalent to more than 13 percent of the national territory. As early as 1976 it was recognized that the land consumption due to development projects in transport, building and housing is one of the most important threats to wildlife species and their biotopes. At this time impact regulations were introduced into German Law. The BNatSchG (Bundesnaturschutzgesetz / Federal Nature Conservation Act) and since the 1990s also the BauGB (Baugesetzbuch / Building Code) have constituted the legal basis for impact mitigation (Louis 2007).

To date impact regulations requiring ecological offset have been implemented in a few countries. Examples are regulations in the United States¹ and in Germany². We compare the implementation of these impact regulations in both countries to identify the implementation characteristics that are best adapted to the problems encountered.

Legislation in both countries provides for impact regulation and requires mitigation measures by the permittee (developer) as a condition of the impact permit issuance. Both in the US and in Germany, the following sequencing of priorities³ applies for the regulation of impacts: prevention, minimization, compensatory mitigation or in certain cases cash donation as a final option. In addition, the mitigation requirement in both countries is tied to an authorization for the impact. A significant difference between the German and the American impact regulation is the definition of impact. Whereas impact in Germany represents a potential burden to nature and landscape independent of the type of habitat affected, impact regulation analyzed in the US only applies to wetland damages.⁴ Consequently, the compensatory mitigation function in the US is commonly referred to as “wetland mitigation”. This difference is reflected in the goal setting of the regulations in both countries. In Germany the goal is to maintain the status quo of functions and values of all the habitats and landscapes (in a dynamic sense). In the US the goal is focused on no net loss of wetland habitats.

As a result of this legislation, three types of mitigation schemes have developed. The first mitigation scheme was permittee-responsible on-site mitigation, the so-called “classic” mitigation, which occurs on a case-by-case basis. In permittee-responsible on-site mitigation, the regulatory agency requires the permittee to carry out compensatory mitigation measures on or close to the impact site (on-site). This requirement exists as a sub-condition or obligation of the impact permit. For a long period of time, along with the possibility of making a cash donation, permittee-responsible on-site mitigation was the only way to compensate in both Germany and the US. As depicted in Figure 1 there are two reciprocal transactions here. The public authority as the agency for the general public issues a permit and the developer is allowed to cause an impact and is obliged to offset the damage.



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¹ National Research Council 2001.

² International comparison of impact regulations (Peters et al. 2002; Darbi et al. 2010).

³ Section 404 Clean Water Act, §15 Bundesnaturschutzgesetz (BNatSchG).

⁴ There is no nationwide regulation in the US for all natural sites; however, in addition to the wetland mitigation regulation under Section 404 of the Clean Water Act, the Endangered Species Act requires mitigation for damages to endangered species habitats other than wetlands.

Figure 1

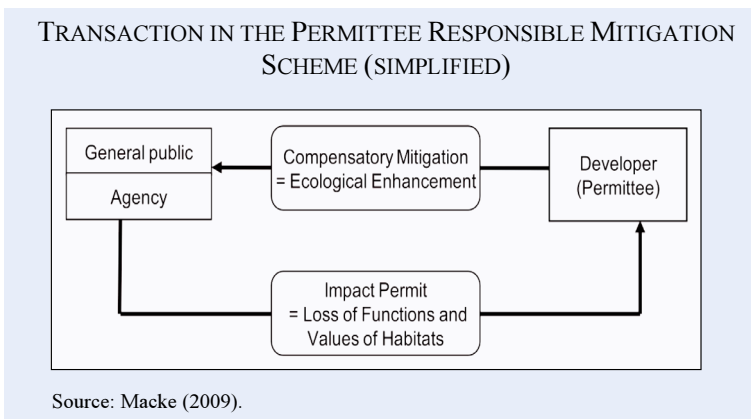
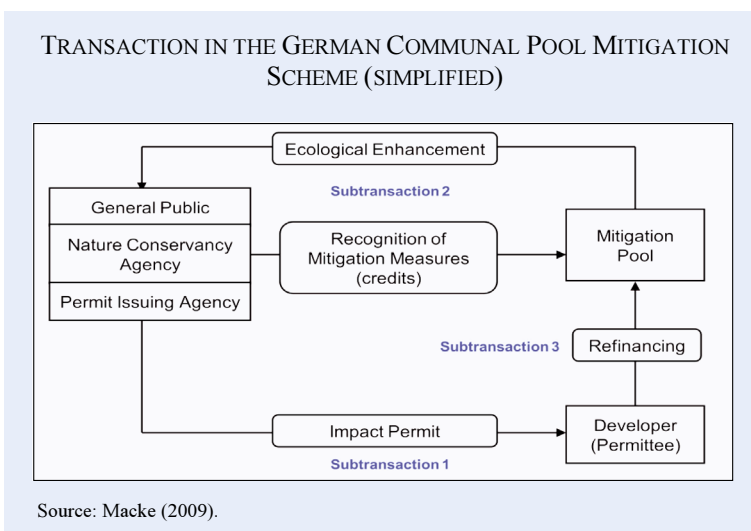


Figure 2



Later new forms of mitigation emerged and have been used more and more often, as on-site mitigation gives rise to a number of problems, e.g., non-compliance and lack of enforcement, time-lag effects, adverse effects from the neighboring or impact site (with high development pressure) and often questionable ecological value of the measures.

Mitigation measures can now also be carried out at locations different from the impact site (off-site), in advance of the impact and by third parties. Both the primarily communally-operated mitigation pools in Germany⁵ and the commercial wetland mitigation banks in the US represent forms of off-site compensation pools. The local authorities in Germany operate these mitigation pools primarily for impacts that occur in their area of jurisdiction. By carrying out mitigation measures on larger sites that serve to offset a number

⁵ Mitigation banks in Germany are in fact operated in some cases by foundations or by profit-oriented companies. Communal mitigation pools are, however, more prevalent (Böhme et al. 2005). In the following we will concentrate on these types to simplify the comparison for German mitigation pools.

of small impacts, they strive above all for a simplified impact regulatory process as well as for an environmentally sound management of compensation measures. The communal mitigation pools therefore serve primarily public non-profit purposes.

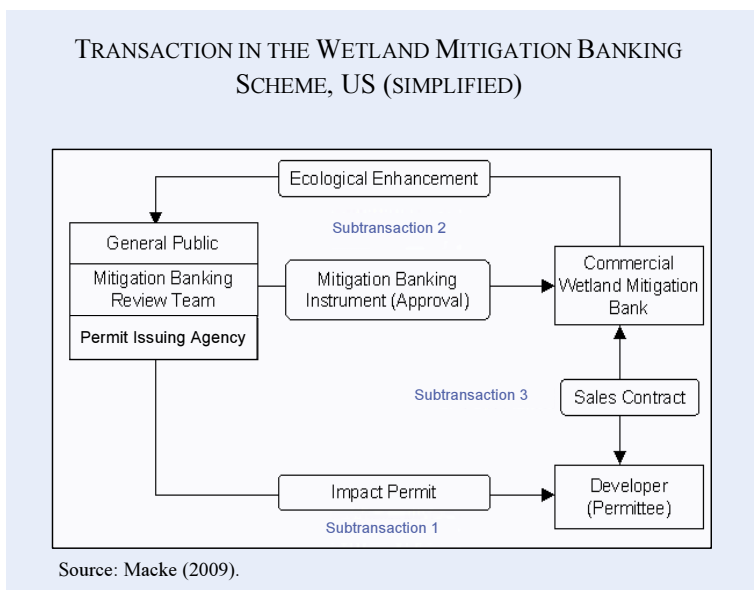
For communal mitigation pools in Germany, it is typical that the environmental regulatory agency recognizes the procurement of mitigation measures in pools before the project is realized, even if this is often done informally. (See the relationship between pool operator and regulatory agency in subtransaction 2 in Figure 2). The use of mitigation credits to meet the obligation of the permit (see subtransaction 1) leads to a third subtransaction between the permittee and the pool operator. As mitigation pools run by local authorities generally issue the impact permit as well as offer compensation measures to the developer (permittee), the relation is generally not market-oriented due to the lack of alternatives for the permittee.

Commercial wetland mitigation banking in the US – especially in Florida – involves private compensation providers (third parties). They create so-called mitigation credits by restoring and maintaining wetlands and sell them to permittees who thereby fulfill their mitigation obligations. Wetland mitigation banks⁶ are large areas⁷ in which an off-site compensation project can be conducted to compensate for numerous impacts. This primarily involves the successful implementation of compensation before the impacts take place. Commercial wetland mitigation banking represents a market-oriented form of compensation. Commercial mitigation banks are characterized by several interconnected partial transactions, as represented in Figure 3.

⁶ Definition: “A [wetland] mitigation bank is a site where wetlands and/or other aquatic resources are restored, created, enhanced, or in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources” (US Army Corps of Engineers/EPA 1995).

⁷ In Florida the average size of a wetland mitigation bank site is over 1,000 hectares (Macke 2009).

Figure 3



Before wetland mitigation banks can sell mitigation credits, however, they must fulfill a number of pre-requisites: they are required to clarify the project details with the authorities, the Mitigation Banking Review Team (MBRT), as part of an elaborate approval process. Additionally, they are required to provide financial securities and define (together with the MBRT) the ecological achievement that is necessary for the full credit approval. In general, the authorities and the wetland mitigation banker agree to a credit release schedule. With this, partial project results can be sold upon verification before the final realization of the project. The wetland mitigation bankers are responsible for securing the achievements. Specific details are contractually fixed in the mitigation banking instrument (the approval/permit for banking).

Economic analysis of mitigation schemes

Using theses derived from New Institutional Economics (Richter and Furubotn 2003; Picot et al. 2003 and 2005; Williamson 1985; 1990 and 2000) we have compared these three compensatory mitigation types in terms of their advantages and disadvantages, thereby identifying characteristics that should positively affect compliance and successful restoration of functions and values of habitats lost by the development projects they are meant to offset.⁸

New Institutional Economics is primarily concerned with contracts in which the obligations of the parties are due at different points in time or with other contracts that define a certain sequence of obligations and therefore require time for their fulfillment (Richter and Furubotn 2003). These characteristics are typical for the coordination of impacts and mitigation measures as the time needed for completion of transaction is generally long. The ecological compensation should exist as long as the impact, with the time necessary for the ecological development resulting in a temporal divergence

between impact and compensation. The use of new institutional economics to understand the provision of public goods and the relationship between private and public agents can thereby increase awareness of problems created by opportunism, uncertainty and transaction costs (i.e., Bonus 1996).

However, new institutional economics are generally applied to economic analyses of transactions between private stakeholders of private goods that are above all distinguished by contracts (cp. Richter and Furubotn 2003). The goal of compensation measures is to enhance an area ecologically. No one is excluded from enhancement of this sort, and there is little rivalry in consumption. Thus, the provision of compensation measures can be called a public good which, alongside the typically private polluter, requires the engagement of a public authority. The relationship between principal and agent is consequently also not a contractual relationship in the original sense.

If one considers, however, that the compensation measure is exchanged for the issuance of the impact permit, the relationship between the impact-permitting public authority and the compensation provider can be understood as an exchange relationship to which the findings of the principal-agent (i.e., Richter and Furubotn) and transaction cost theory (i.e., Williamson 1990; 2000) can be applied. A further modification of contract theory to this type of “exchange relationship” was therefore used for the development of three theses on impact regulation. They establish the basis for a comparative analysis of the three mitigation schemes.

⁸ A detailed description of these characteristics can be found in Macke (2009).

The influence of conflicts of interests

We derive our first thesis from the principal agent theory:

The greater the conflict of interest between nature protection agency and compensation provider is, the more likely noncompliance and negative external effects at the expense of the general public are to occur.

The degree to which an agent achieves the goal of a principal is not only determined by the agent’s capabilities, but also by his interests. Only if the regulatory agency is interested in nature conservation, will full compliance with the agency’s requirements also imply fulfillment of the goals of the principal, the “general public”. And only if self-interest in compliance can be generated by those responsible for the mitigation action, can monitoring costs of the regulatory agency be lowered. Depending on the mitigation schemes, monitoring costs will be born by the agent or by the principal. Inspections, reporting and monitoring obligations for the agents have a disciplinary effect on the compensation provider.

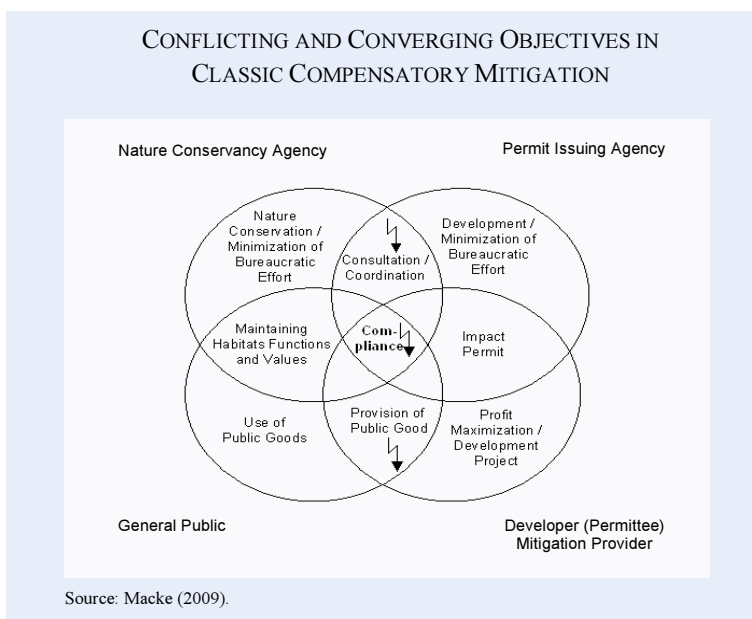
German permittee-responsible compensatory mitigation

As is illustrated in Figure 4, in this mitigation scheme a convergence of goals occurs between the impact-permit issuing agency and the developer, as both are interested in a minimization of the process costs, whereas a greater conflict of interest exists between

the issuing agency and the nature conservancy agency, which we assume acts as the agent of the general public. Before issuing the urban impact permit there is an unequal power relationship between the public agencies and the developer since the developer can typically use the entire project as leverage in the “negotiations” of specifying the mitigation obligations (measures) with the public authorities (especially using the argument of potential jobs otherwise being created elsewhere), while public authorities will not tend to endanger the entire project since it is necessary to weigh all interests when planning urban development. The conflict of interest between the developer and the nature conservancy agency leads to a higher risk of non-compliance especially regarding long-term management of compensation sites, once the permit is issued.

In classic compensatory mitigation the compensation provider is usually also the developer who has no inherent interest in mitigation activities and their ecological benefits, once he has received the permit. This endangers compliance if monitoring can not be implemented. Due to the fact that monitoring many small sites is very costly, after initial construction, controls, as has been shown empirically, are often neglected. Furthermore the developer’s particular capabilities as compensation provider are restricted – if at all existent – in potential property rights on surrounding areas, which can be used for on-site mitigation. We therefore conclude that commissioning the developer as the compensation provider would not increase efficiency.

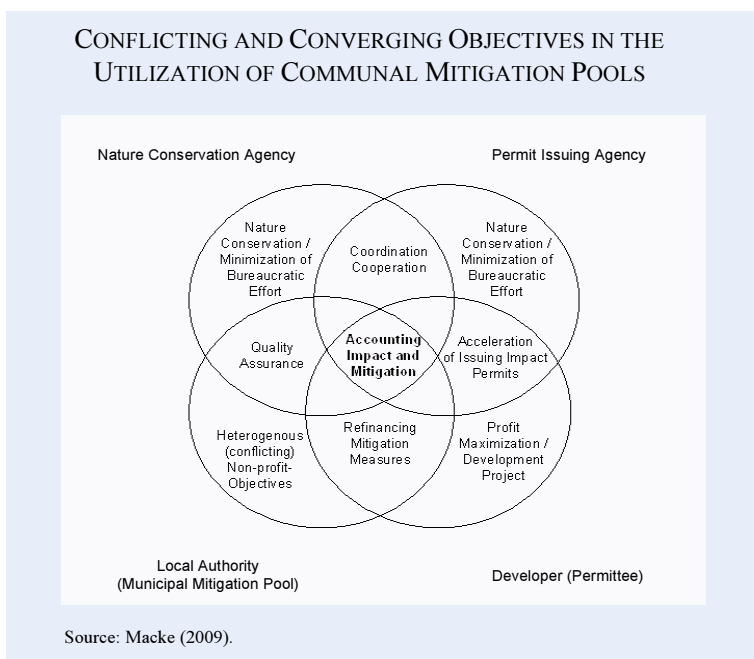
Figure 4



Communal mitigation pools in Germany

For communal mitigation pools in Germany to function, the local environmental protection agency has to recognize the mitigation pool areas of a mitigation pool operator as potential sites for mitigation to offset accruing impacts (Figure 5). In general consultations between the mitigation pool manager and the nature conservancy agency occur in a timely and voluntary manner since this reduces possible conflicts at a later date – when mitigation credits for a certain impact project are debited – which the nature conservancy

Figure 5



agency has the right to respond to as representative of public interest. Another advantage of mitigation pools for the nature conservancy agency is that, as long as not all the credits are sold, the pool operator has an interest in the mitigation measure’s success. Implementation quality is thereby guaranteed for the public authorities with minimal administrative efforts.

Local authorities appreciate the availability of mitigation sites since a lack of compensation areas can hamper development. For communal mitigation pools, success is not a result of a directive of the relationship between the nature conservancy agency and the local authority, rather it is following a cooperative understanding.

The implementation of mitigation measures before potential impacts, the approval of mitigation pools and the possibility of refinancing when credits get used often lead to a considerable acceleration of the impact permit process. Both parties benefit from this: the developer, who typically saves high costs (opportunity costs as well as time savings in searching for an area, developing a compensation concept, etc.), and the permit-issuing agency, which benefits from a simplified administrative impact permitting process compared with permittee-responsible compensatory mitigation. In addition, lower costs for protecting the mitigation area by ownership also arise compared with on-site mitigation, since land prices near the impact area are often higher than in other locations due to the high development potential in

those areas. If mitigation credits are produced in advance, the mitigation projects implementation is guaranteed.

Nevertheless, communal mitigation pools carry new internal uncertainty risks due to the heterogeneous goals of the participating agencies and persons. Local authorities, responsible for both the impact permit and for providing mitigation might be “biased” and depending on the agencies involved and their specific motivation and power, outcome might differ. Especially in the bigger German cities (kreisfreie Städte) outcome depends strongly on the quality of cooperation with the local conservation agency (Untere Naturschutzbehörde).

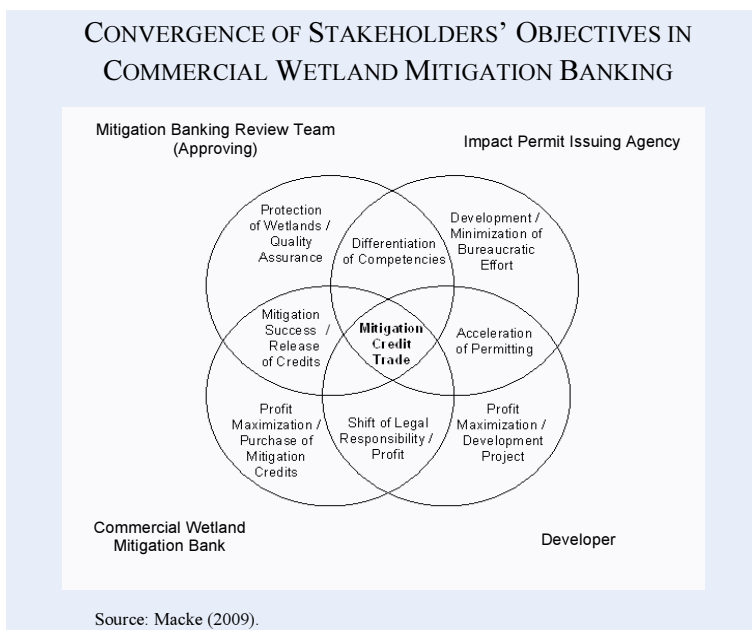
Since mainly the municipalities decide on both impacts and mitigation requirements, in the day-to-day routine they can utilize a considerable legal range virtually uncontrolled by the municipal supervisory bodies (Kommunalaufsicht; Macke 2009). The division of impact decisions and compensation requirements is not clearly delineated here, meaning that supply, demand and regulation in the mitigation credit market within local authorities are entangled, creating the conditions for opportunistic behaviour to occur, possibly at the expense of nature-conservation goals (Macke 2009).

Commercial wetland mitigation banking in Florida

In commercial wetland mitigation banking a strong convergence of goals exists between the mitigation provider and the Mitigation Banking Review Team. The mitigation banker would like to sell its service (the ecological enhancement) and requires permission from the Mitigation Banking Review Team.⁹ Since it can only sell mitigation credits upon successful completion of a project, which is in the inherent interest of the MBRT, both strive for the same goal in a result-oriented manner, albeit for different motivations. The permittee can acquit itself of its compensatory duties and the associated implementation and long-term management risks through the purchase of credits (Figure 6).

⁹ MBRT with local representatives from US Corps of Engineers, Environmental Protection Agency, US Fish and Wildlife Service etc. (Macke 2009).

Figure 6



This reduces the initial conflict of interests between the developer and the regulatory agency, since for the developer meeting mitigation obligations of the regulatory agency by buying credits from a commercial wetland mitigation bank is the simplest, fastest and safest way.

Potential opportunistic behavior from both sides (banking operator and MBRT) is institutionally intercepted. There is exchange of information within the mitigation banking review process. Further tools of safeguarding are financial and legal guarantees for the mitigation project, controlling and reporting requirements, and the release of mitigation credits to sell as soon as well- defined performance standards are reached (Macke 2009). Details are written in the Mitigation Banking Instrument (bank permit). With this institutional design, the level of uncertainty is low.

In this mitigation scheme the specific capabilities of the agents are also utilized beneficially. The profit-oriented wetland mitigation bank operator generally provides technical expertise, land areas and capital.

The influence of asset specific investments

Thesis 2 is derived from transaction cost economics:

The larger asset-specific investments and transaction hazards are the higher the transaction costs to secure upfront-investments in a market environment and the more efficient vertical integration becomes.

In this case vertical integration is equivalent to having the mitigation project provided by the public authority or the community itself.

A particular problem of opportunism is the potential concealing of opposite intentions through a transaction partner (hidden intention). In the context of asset-specific investments and their associated “sunk costs”, this becomes a serious problem. This is because a so-called hold-up problem¹⁰ arises due to the asset-specificity of the investment. The transaction cannot be aborted without costs and thus a dependence on the transaction partner occurs. The

transaction partner can try to take advantage of this dependence through opportunistic behavior and appropriate the quasi-rent in renegotiations. This negatively affects asset specific investments. As a result asset specific upfront investments require an institutional guarantee as soon as they occur in a market (Erlei et al. 1999).

The hold-up problem – applied to the impact/compensation situation – exists on the one hand when the public authorities allow the impact to occur before compensation. Then a developer, acting as the compensation provider, can behave opportunistically and put the public authorities in an unfavourable position, making it difficult for them to enforce mitigation. Safeguards are possible, but result in additional transaction costs. On the other hand, if the compensation provider makes upfront investments which can generally not be utilized otherwise, e. g., placing the mitigation site under conservation easement or by almost irreversible landuse changes, the mitigation provider depends on the approval of public authorities in order to sell its service to a third party. Specificity furthermore arises from the spatial-functional context.

Classic compensatory mitigation and communal mitigation pools in Germany

For the permittee-responsible mitigation, a certain level of proximity between the impact and mitiga-

¹⁰ Klein et al. (1978); Williamson (1985); Ewerhart (1997).

tion is sought, concerning the location as well as functional aspects. Since the site-specificity is accordingly high, this transaction is poorly suited for market governance. Since mitigation measures are generally carried out on-site and by the developers themselves, this is an outsourced action from the principals' perspective (the general public/local authorities). The high level of uncertainty regarding the behavior of the agent in combination with asset-specific investments would conversely favour vertical integration, meaning to in-source mitigation on behalf of the public sector, as is the case in communal mitigation pools. If frequency is high enough, as is the case in most communities, an increase in efficiency is thus to be expected from vertical integration, e.g., communal mitigation pools. But vertical integration comes at the price of considerably weakening the on-site character (spatial proximity) as given in the classical mitigation scheme. Furthermore, the advantages of this scheme can also only be realized under the assumption that the public sector negotiates in the role of the principal, the general public. As we have seen in thesis 1, this assumption should, however, be viewed skeptically regarding multi-objective decision making of communal authorities.

Commercial wetland mitigation banking in Florida

Wetland mitigation banking involves a regulated market. The site-specificity for commercial wetland mitigation banks is reduced in comparison with permittee-responsible, on-site compensatory mitigation. A wetland mitigation bank can compensate for a number of adverse environmental impacts. However this flexibility also has its limits: the spatial-functional context between impact and mitigation is limited by defining the banks service area on a watershed basis and by distinguishing various mitigation credit types, depending on the habitats properties gained (and lost).¹¹

To obtain credits in wetland mitigation banks, the bank operator has to invest his capital and time in very asset-specific investments, protecting the compensation area under conservation easement and restoring wetlands. After the investment has taken place, the wetland mitigation banker becomes dependent on the authority's decisions. Theoretically a reverse agent-principal hold-up problem arises. From the perspective of the regulatory agency or the

general public, this disciplines the mitigation provider and supports his self-interest in high quality. From the perspective of the mitigation bank operator this dependency might deter investments. In the wetland mitigation schemes this risk is institutionally absorbed by the formal approval of the wetland mitigation bank (Mitigation Banking Instrument as a permit notification) in a very early phase.

Additionally, further measures exist that limit the risk of the mitigation banker. This includes, above all, the credit release schedule which allows the bank operator to gradually sell a portion of the mitigation credits (of the anticipated credit gaining potential of the area/possible ecological lift) as soon as predefined performance standards are reached. This allows for advance income and thereby a certain level of liquidity for the necessary investment. Since both the wetland mitigation banker and the MBRT place a significant amount of resources into the bank permit process and thereafter maintain a mutual interest in the continuing existence of the transaction relationship (build-up reciprocity as a guarantee mechanism), this creates additional trust and a willingness to cooperate. The agencies represented in the MBRT also have an interest in a successful relationship in the long-term since they have invested time and other resources in the process in advance and would like to ensure future benefits, such as decreased control efforts.

This type of governance seems to be well adjusted to match the characteristics of the transactions in mitigation. Market coordination between the permittee (developer) and the commercial wetland mitigation banker using classic contracts is preferable, as costs and bureaucratic efforts can be saved while market transparency can be ensured with little effort (online databases are available). Wetland mitigation banks make economies of scale possible. These have advantageous effects for the set-up costs of coordinating and safeguarding (controlling) the transaction as well as for the actual execution of the measure.

In summary, several factors indicate the efficiency of market-oriented wetland mitigation banking as a hybrid form of organization. These factors include the comparatively low uncertainty due to implementation of mitigation measures before impacts, the low risk of opportunism and the specific bilateral investments of the transaction partners as well as the moderate site-specificity. Though "on-site mitigation" is not possible with this approach, "in-kind"

¹¹ Florida, for example, distinguishes four types of credits: saltwater, freshwater, herbaceous and forested wetlands.

mitigation is implemented to the extent that a watershed service area approach is applied and that various types of wetland habitat credits are distinguished.

The influence of full cost internalization

Property rights theory is the basis for thesis 3:

Only if long-term enforcement of compensation is guaranteed, will the permittee causing the damage consider all of the costs and benefits associated with his decision to develop.

Impact regulations create private costs of compensation (planning, mitigation measures and long-term management), which are meant to reduce the external costs of the impact. Therefore impact regulations can also make the permittee consider the social costs of his private decisions. If full compliance is achieved, in theory the external effect is internalized. But as it is costly to comply, compliance has to be monitored and enforced. The different impact regulation schemes discussed here use diverging approaches to do so.

Classic mitigation scheme Germany

In permittee-responsible compensatory mitigation the polluter-pays-principle is implemented de jure because the developer himself is required to compensate the damage to the environment. However a considerable de facto violation of the polluter-pays-principle occurs because third parties (the general public) bear the costs of governance as well as for natural losses due to non-compliance. Empirical results show that in many cases compliance cannot be enforced and therefore external costs cannot be internalized.

Commercial wetland mitigation banking Florida

In commercial wetland mitigation banking, on the other hand, the polluter-pays-principle is carried out to the greatest extent possible because the commercial wetland mitigation banker transfers the entire costs to the permittee (developer buying the credits). Additionally, the wetland mitigation banker bears the costs of failing projects (no credit release) and upfront investments (no release of mitigation credits/no appropriation of impact). Transaction costs of approval and safeguarding, which remain partly with the authorities, are not charged to the developer. Compared with permittee-responsible compensatory mitigation, these transaction costs are considerable and strain the authorities and the gen-

eral public especially in the bank-approval process (MBRT process). The cost-reduction effects of approved commercial wetland mitigation banks achieved through the (ex post) inspections of few large sites by the authorities together with the reduced enforcement efforts by the authorities are, however, positively assessed (Macke 2009).

Communal mitigation pools Germany

For communal mitigation pools in Germany, there are considerable weaknesses in the implementation of the polluter-pays-principle, since developers are often not charged the full costs – due to a lack of political will or administrative difficulties. In addition, refinancing as such is associated with considerable bureaucratic efforts. Furthermore, due to budgetary laws in Germany, management and overhead costs often cannot be charged to the developer – a burden that can significantly limit the establishment of communal mitigation pools. In addition this weakens the polluter-pays-principle.

Conclusions

The institutional economic analysis of existing impact regulations in the US and Germany shows that many reasons can be found to explain the disappointing performance of permittee-responsible on-site mitigation. Though in theory this instrument could induce a full internalization of costs, economies of scale in both production and controlling cannot be realized with this instrument. At the same time the incentive for opportunistic behavior of the developer is very strong after the impact permit is issued, resulting in high ecological costs through noncompliance and poor implementation and insufficient long-term management.

If impact regulations are made more flexible, both vertical integration (production by the authorities through communal mitigation pools) and the use of regulated markets become possible. Compared with permittee-responsible on-site mitigation, off-site pools reduce production and ecological costs, thereby realizing economies of scale in ecological enhancements as well as in transaction costs (if frequency of credit selling is not too low). These advantages of an off-site pool are independent of the supplier (public vs. private etc.).

Mitigation pooling through third parties (communal pools and commercial wetland mitigation banks) has

even more advantages. Agents with specialized knowledge can be called upon, who have their own interest in compensation and the success of the project. As soon as profit-oriented third parties are integrated into the process, opportunistic behavior is anticipated by the authorities and – at least in the US (Florida) – this is institutionally absorbed and safeguarded. The initial ecologically successful implementation is virtually guaranteed.

In Germany, opportunistic behavior by public providers has not been taken into consideration. As a result there are few safeguards to protect against this. Our analysis shows, however, that major conflicts of interest require safeguards especially for communal mitigation pools. Assuming that the same product quality can be obtained from publicly and from privately operated pools, full cost internalization is hampered by an obvious lack of full cost accounting in the German communal mitigation pools.

Quality control is a crucial prerequisite for confidence in the pooling approach, both for the general public and the bank operator.¹² The experience in Florida demonstrates that an intensive market entry process can limit the hold-up problem for the private bank operator. The determination of ecological performance standards for releasing mitigation credits are likewise assessed positively. Asset-specific bilateral upfront investments in the banks' approval process lead to mutual interest in the long-term success of the mitigation project. The administration can concentrate its resources on its regulatory functions. The high debiting frequency leads in particular to efficiency in set-up and safeguarding efforts. This results in win-win-win situations between the regulatory agencies, the permittee (developer) and the commercial provider of mitigation credits.

In comparing the three compensation schemes, major problems with permittee-responsible compensatory mitigation have become apparent, as expected from the empirical results. The extent to which market coordination as a type of governance structure is feasible depends on the strength of the on-site preference of the authorities. Only if these are reduced, as is the case in Florida and partly in Germany too, can municipal mitigation pools function as a kind of vertical integration or a market-based solution similar to that in the US. A regulated market, as

witnessed in commercial wetland mitigation banking, is therefore the most preferable type of governance from the new institutional economics perspective with the caveat that utilizing safeguarding options against moral hazards are necessary. The Florida case shows that this does not preclude a close functional link to the habitats lost by the impact.

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¹² For further measures on the configuration of a market-friendly, transaction-based environment, see Macke (2009).