

# **8** *Recreational Gains and Losses*

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## OVERVIEW

This chapter outlines the procedures and techniques for assessing the potential recreation and amenity benefits of – or losses from – coastal erosion or fluvial flood risk management. The term ‘recreation benefits’ covers benefits arising from the enjoyment of landscape, wildlife and natural amenities as well as from the enjoyment of recreational activities.

The approach to assessing these gains and losses has not altered in any way since 2010. The changes here only comprise providing up-dated data in Table 8.3: *£ gains and losses per adult visit with coastal protection scheme options at coastal sites* and Table 8.4: *£ value of losses and gains per visit for various changes at river sites* in Tables and Figures for Chapter 8 on MCM-Online. This up-dating has been done using the Office for National Statistics (ONS) Consumer Price Index (CPI).

## LESSONS FROM EXPERIENCE

- Estimating the visit numbers or the number of beneficiaries deserves to be given as much attention as estimating valuations, and this has not always been the case in the past;
- The kind of visitors who visit ‘natural’ undeveloped coasts are different in some respects from those who go to developed sites. If coastal sites were to be changed radically to a more ‘natural’ condition, they might draw on a different constituency of visitors (making the new visit numbers difficult to determine);
- The public are generally supportive of measures to protect and defend the coast through major interventions such as seawalls and off-shore reefs;
- People who visit or live at the coast are reluctant to see natural erosive processes take their course at the coast and want the coast to continue to be maintained and defended as it had been in the past. This makes such options as ‘managed realignment’ or ‘retreat’ difficult to implement;
- The few river restoration studies, in contrast, show that residents are supportive of, and attach value to, works to restore rivers to a more natural condition, where the level of flood risk is not increased;
- Public responses to, and thus valuations of, options and structures at the coast, such as rock groynes vary from site to site in ways that are difficult to predict. This makes benefit transfer approaches problematic;
- The recreation benefit assessment methodology recommended here does not take into account new visits (as opposed to transferred visits) that may be generated among local residents or more widely. Nor is additional visiting by current users easily allowed for (again not transferred visits);
- Questionnaire surveys can make a valuable additional contribution to public consultation and participation on coastal and fluvial projects but early engagement is an ideal that may be difficult to achieve, not least because new options emerge within the appraisal period;

- Recreation and amenity changes are of vital public interest. There are few – if any - legal obligations in this respect on those promoting coastal and fluvial risk management, as opposed to the Water Framework Directive's strictures, but the issues still need very close attention.

## ESTIMATING RECREATION BENEFITS

Recreation benefits are calculated by multiplying the £ value of a visit for recreational use (often a small number), derived using the Contingent Valuation (CV) method, by the number of visits or beneficiaries (often a large number). The crucial stage in estimating recreational benefits is usually the estimation of the number of visits or beneficiaries.

The CV method (see 'expressed preference' methods in Chapter 2) is essentially a questionnaire survey method in which respondents are asked directly in carefully designed survey questions to say what value they place on, or how much they would be willing to pay (WTP) for, a change in the availability of a resource such as beach or riverside recreation.

We have developed and tested a particular variant of the CV method, the value of enjoyment per adult visit (VOE) method. In this approach, respondents are asked to say what value they put on their enjoyment of a day's visit under varying options in £ and pence.

In the WTP approach, respondents are asked how much they would be willing to pay in entrance fees or in rates and taxes for a change in recreation opportunities/values such as provided by a coastal protection scheme. The advantages and disadvantages of the two approaches have been debated but in this Handbook and the associated MCM (Penning-Rowse et al., 2013) the VOE approach remains the recommended method and the basis for the standard data presented here.

## THE RECOMMENDED APPROACH AND TECHNIQUES

A two-stage framework for recreation benefit assessment is recommended. This involves:

- **An initial study stage** for initial examination of projects and for strategy studies. This will normally rely upon secondary source data and desktop methods. Table 8.1 presents a range of methods for estimating visit numbers. It is acceptable here to use standard values or data from existing CV studies and visit data. Data that can be used on visit numbers are presented in Table 8.2: *Examples of visit numbers used for benefit assessment purposes*. Table 8.3: *£ gains and losses per adult visit with coastal protection scheme options at coastal sites* gives data on losses and gains with various options at coastal sites, and for rivers in Table 8.4: *£ value of losses and gains per visit for various changes at river sites*. Using secondary source data on values and visit numbers in this way is, however, a very approximate approach;
- **The full detailed study** stage involving detailed site-specific information and data collection methods: site-specific counts of visit/visitor or resident numbers and a site specific CV survey to provide site-specific estimates of the value of recreation with the different scheme options. These surveys and count procedures are expensive and time-consuming activities to mount and manage.

In making the key decision as to whether or not to proceed to a feasibility study, it is recommended that a form of sensitivity analysis is undertaken using combinations of the highest and lowest appropriate estimates of visit numbers and £ value per visit (based on data in Tables 8.2-8.4) to obtain four annual recreation estimated benefit assessments.

Then, the difference the four estimates make to the overall benefit-cost ratio for the scheme can be considered, to aid a decision as to whether it would be worth refining visit number estimates or valuations through site-specific data collection.

At both outline and detailed study stages it will be necessary to go through the same steps (see below) but at different levels of detail.

#### Step One: Define the problem and objectives

This is the definition of the nature and rate of coastal erosion or degradation or of coastal or fluvial flooding, and with it the geographical area affected: its length and breadth and its characteristics and the type of changes to the physical characteristics that are likely to take place in the future with the 'do nothing' situation.

Problems such as coastal erosion may be site-specific or may affect a more extensive area. Similarly the problems affecting a river may be present in much of the catchment or may be site specific. It is essential in this way to consider problems and the options for dealing with them in their wider context.

#### Step Two: Identify adult recreation and amenity users or beneficiaries

Find out whether there is current or potential recreational use of the site and identify the range of recreational activities that are, or could be, undertaken there. Although children may be important users of the coasts and riversides, the benefit assessment methods apply to adult users or beneficiaries only.

Visitors can also be classified according to their origins:

- **Local visitors.** Those living within a three-mile radius of a site;
- **Day visitors.** Anyone starting and finishing their trip from their permanent home;
- **Staying visitors.** Anyone staying away from home for one or more nights.

Recreation benefit assessments can be refined by obtaining and using separate visit number and £ value per visit estimates for these different categories of user as presented in the *Checklist of recreational uses* and *Summary of possible effects of options on coastal and riverine recreation and amenity* available in the Additional Resources section for Chapter 8.

A crucial issue in both outline and detailed studies is to establish the level of use of the site in terms of the number of visits it receives or the number of those who benefit from recreation at the site. It is recommended that two or more of the methods presented in Table 8.1 should be used and that indirect methods (items 4-8) should only be used in initial study stages.

<b>Table 8.1</b>		Sources and methods of information on recreation users/beneficiaries
<b>Source/ method</b>		<b>Comments</b>
1	Long period counts using people counters	Infra-red or other counters installed over a period (at least March to September). Counters are manually calibrated to relate passages to adult visits. Mainly applied in detailed studies: in conjunction with a CV survey – see MCM, Section 8.5.3 (Penning-Rowse et al., 2013).
2	Short period manual count /surveys	Manual counts/surveys over a period of days normally including the August Bank holiday. At initial stage, this method might be combined with site visits and at detailed study stage, with the CV survey.
3	CV survey data	CV survey data on the frequency of visiting by local residents in conjunction with census data on the number of adult residents and staying visitors (in conjunction with managers' estimates of occupancy rates) can be used to generate visit number estimates. However, the tendency of survey respondents to overstate their visiting frequency has to be noted - see the Corton Case Study in the MCM, Section 8.7 (Penning-Rowse et al., 2013).
4	Old survey/ count data for the project	Planning, tourism or recreation departments of local authorities or local colleges or schools may have undertaken surveys or counts at the project site in the past, which can be updated to indicate current levels of use.
5	Inferred estimate	The number of visits to a coastal or river site is inferred from counts of visits to a related site nearby such as: Car and coach parks multiplied by the average adult car or coach occupancy rate (Hengistbury Head), funfair, cafe, visitor centre, historic site or museum (Hurst Spit and Hurst Spit castle). This requires estimating the proportion of all visitors to the project site who also use the counted site and vice versa. At detailed level, this can be done in conjunction with the CV survey.
6	Visitor equations	A number of equations have been developed which predicts-distance-frequency functions so that from census data on the population in different zones a prediction can be made as to the number of visitors generated by the site.
7	Estimates from an informed persons or source	Written, telephone or personal contacts with: Car park attendants, park rangers/wardens, visitor centre staff, staff at associated visitor attractions, local authority tourism, sport and recreation or planning staff, regional or local offices of organisations such as the English Tourist Board, National Trust or English Heritage and their Welsh equivalents, the Environment Agency's recreation and fisheries staff, managers of general recreation or staying visitor facilities or tourism business organisations that may have information on bedspaces and occupancy rates - see the Corton Case Study in the MCM, Section 8.7 (Penning-Rowse et al., 2013); both commercial and club managers of specialist facilities (e.g. sailing, boating/sailboarding, fishing, birdwatching) and specialist organisations at national regional and local level for information on the availability of alternative sites e.g. for caravans or sailing.
8	Average number of visits to equivalent sites	This benefit transfer approach is only suitable for initial and strategic studies. The number of adult visits to the project site is estimated as being of the same order as the number of visits made to an equivalent site. However, there are few sites for which good data are available and little research to enable reliable identification of an equivalent site.

### Step Three: Identify options

Identify the options for dealing with the problem and their likely impacts on the physical characteristics of the site as well as the 'Do nothing' option. Thus recreation benefits may have the following two components:

1. The prevention of further deterioration - losses with the 'Do nothing' option.
2. A reinstatement of the condition of the site from the current state to a better one – gains. For example, the replacement of hard river flood defence structures reaching the end of their life with soft engineered defences may enhance the recreational value of a river site. Beach nourishment for coastal protection purposes may result in a 'better' beach in recreational terms.

### Step Four: Identify the recreation and amenity benefits

Identify the impacts on recreation and amenity of the changes to the physical environment resulting from the 'Do nothing' and the 'Do something' options.

This process will benefit from the participation of the recreational stakeholders, particularly at the initial stage. They may have particular insights into how changes will impact on their recreational enjoyment.

### Step Five: Determine the annual recreation and amenity benefits

**Annual recreation benefits.** Step 5 involves first deriving estimates of the annual recreation benefits arising from the options and comparing the benefits for the options.

There are two components that have to be estimated:

1. The value that individual adult users or beneficiaries place on the changes that would occur with the options in place. These values will be derived from an application of the CV method using either the VOE per visit or the WTP approach.
2. The annual number of adult visits to the site (for the VOE approach) or beneficiaries who have an interest in the site (for the WTP approach).

The annual recreation benefits can then be determined as:

#### Equation 8.1

Annual benefits =  
£ value of the options (VOE gains and/or losses) or (WTP valuations) \* the number of visits per annum (VOE) or number of beneficiaries/ visitors (WTP)

Where the options involve both VOE losses and gains, the annual benefits should be calculated separately for the losses and the gains because these may need to be treated differently for discounting (see Total recreation benefits below).

**National economic benefits and substitute sites.** If changes to a particular coastal or river site simply transfer recreation from one site to another without any overall gains or losses in the value of recreational enjoyment, once travel costs have been taken into account, then no national gain or loss will be involved. The availability of substitute sites must therefore be considered when recreation benefits are being assessed.

**Total recreation benefits.** The total recreation benefits of a scheme are estimated by discounting the annual benefits over the life of the project using the recommended 'Green Book' discount rates. A different approach and separate calculations are required where there are annual benefits from both VOE losses and gains with the options, since gains become available on scheme completion whereas losses are likely to be incurred only after some years of site deterioration.

#### Losses under the 'Do nothing' option: VOE approach<sup>1</sup>

The following two equations should be used for estimating possible losses (or gains) under the 'Do nothing' option: some respondents may enjoy the site under the 'Do nothing' option more than the current site and therefore might gain.

Benefit for those who continue to visit:

**Equation 8.2**

$$L1 = Eo - E^1$$

Benefit for those who would visit an alternative site under the 'Do nothing' option:

**Equation 8.3**

$$L2 = (Eo - Ea) + (Ca - Co)$$

where:

L is The benefit per person (in cases 1 and 2)

Eo is The value of enjoyment of today's visit/ a visit in current conditions

E<sup>1</sup> is The value of a visit under the 'Do nothing' option

Ea is The value of a visit at the alternative site under the 'Do nothing' option

Co is The cost incurred visiting the present site

Ca is The cost incurred in visiting the alternative site under the 'Do nothing' option. The difference between Co and Ca is derived from a question in the questionnaire.

<sup>1</sup>These equations are explained more fully in the MCM (Penning-Rowsell et al., 2013)

#### Gains under the 'Do something' option formulae:

##### VOE approach

Two similar equations should be used for estimating possible gains (or losses) under the 'Do something' options: some respondents may enjoy the site less than the current site under the 'Do something' option, for example where there is a radical change in the appearance or recreational facilities with the option. Also, they might wish to visit elsewhere instead.

Benefit for those who continue to visit:

**Equation 8.4**

$$G1 = Exn - Eo$$

Benefit - for those who would visit an alternative site under the 'Do something' option n:

**Equation 8.5**

$$G2 = (Eo - Ean) + (Can - Co)$$

where:

G is The benefit per person (in cases 1 and 2)

Eo is The value of enjoyment of today's visit/ a visit in current conditions

Exn is The value of a visit under the 'Do something' option n

Ean is The value of a visit at the alternative site visited under the 'Do something' option n

Co is The cost incurred visiting the current site

Can is The cost incurred in visiting the alternative site under the 'Do something' option n. The difference between Co and Ca is given by a question in the questionnaire.

Using these equations, the losses and gains should be calculated for each person in the survey and then the mean value should be calculated.

## REMAINING ISSUES

- Estimating the visit numbers or the number of beneficiaries deserves to be given as much attention as estimating the VOE or WTP valuations. Shoreline Management Plans (SMPs) should be investigated for this data, and Catchment Flood Management Plans (CFMPs) may be sources for fluvial cases;
- Coastal studies indicate that the public are often reluctant to see natural processes take their course at the coast and may want the coast to continue to be maintained and defended as it had been in the past;
- Visitors who visit 'natural' undeveloped coasts are different in some respects from those who go to developed sites;
- Public responses to, and thus valuations of, options and structures at the coast such as rock groynes, vary from site to site in ways that are difficult to predict. Therefore, there is still a need for most schemes for site-specific CV surveys at detailed studies stage for both coastal and riverine sites;
- The few river restoration studies, in contrast, show that residents are supportive of, and attach value to, works to restore rivers to a more natural condition where the level of flood risk is not increased;
- The recommended methodology does not take into account new visits (as opposed to transferred visits) that may be generated among local residents or more widely. Nor is additional visiting by current users easily allowed for (again not transferred visits). Both are impossible to gauge without substantial databases or surveys. There may, therefore, be significant underestimating of the benefits of schemes which offer substantial improvements or attractive new facilities.

## REFERENCES

Penning-Rowsell, E.C, Priest, S., Parker, D., Morris, J., Tunstall, S., Viavattene, C., Chatterton, J., Owen, D. (2013) Flood and Coastal Erosion Risk Management: A Manual for Economic Appraisal, London and New York, Routledge.