ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 8| August2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

# CASE STUDY ON EFFECTS OF CONSTRUCTION ON THE AQUATIC LIFE

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**ABSTRACT**
*The construction of any type's crossings to facilitate road schemes can potentially impact upon adjacent aquatic ecosystems. Such construction activity can pose a risk both to the physico-chemical and ecological quality of the aquatic environment. The EU Water Framework Directive requires member states to ensure that there is no further 'degradation in water quality' and to maintain 'good ecological and chemical status' of surface waters by 2015. In this context, it is important to understand the potential impacts of river-crossing construction and the methods for mitigating such impacts. This paper presents a critical review of current knowledge on such impacts, which is presented under three headings: water quality, river hydraulics and aquatic ecology. The review has identified knowledge gaps in all three areas, with the issue of the impact of suspended solids on aquatic ecosystems being a priority. The review concludes that some water quality standards may not provide sufficient regulatory control of discharges to the aquatic environment from river-crossing construction activities.*

**KEYWORDS:** *River, construction, suspended solids; aquatic ecology; water quality; hydraulics*

## INTRODUCTION

Freshwater systems and associated ecological processes are intimately linked to their drainage basins and, consequently, are under pressure from a wide range of land-use activities. In particular, the construction of river crossings to facilitate motorways poses the risk of severe and, in some cases, lasting damage to the physical, chemical and ecological quality of the aquatic environment. With the introduction of the EU Water Framework Directive in 2000 it is imperative to understand and mitigate potential impacts relating to river. A considerable body of research has been undertaken, both at the field and at the laboratory scale, concerning the impact of road construction activities on the aquatic environment. This review attempts to summarise the relevant literature. It is presented under the following topics: (a) water quality, (b) river hydraulics and (c) aquatic ecology. Although the focus of this review is on road crossings of watercourses, the findings may be applicable to other watercourse crossing activities, such as underwater pipelines or railway bridge crossings. From a review of the literature, the main impact of river-crossing construction would appear to be the generation of an increase in the concentration of sediment, mainly suspended solids

## METHODOLOGY

- Study on Aquatic life and construction
- History of Construction
- Different effects on aquatic life
- Preparations of details report
- Result and conclusion

## MODELING AND ANALYSIS

**Effect on Different Parts**

1. **Effect on water quality**

As sediment input is a concern during watercourse- crossing construction, we have compiled information on existing standards. River crossings that are poorly designed can disrupt natural river hydraulics and cause such problems as increased erosion, flooding due to change in flow, blockage by debris and fragmentation of in-stream and riparian habitats. Inappropriately positioned culverts or bridge piers that are constructed without adequate understanding of river flow dynamics can result in scour and erosion. The turbidity of water get change and it affect

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Marin life respiratory system
Rang for turbidity
For River 10 to 20 NTU
Sea Water 0.1 to 28.7 NTU
Where NTU- Nephelometric turbidity unit (Means presence of suspended soild

**2. Water Velocity**

Stream water velocity and culvert geometry are related by the continuity principle of hydrodynamics. The cross-sectional area of the culvert must be sufficient to maintain water velocities below threshold limits. However, excessively wide culverts may result in very low water velocities, which may lead to deposition of SS and inadequate water depths for fish passage. Therefore, to achieve the desired velocity range under flow extremes, it may be necessary to provide, for example, twin-box culverts, one aperture for dry weather flows and the second for storm flows

**3. Water Depth**

Culverts should be designed so that fish passage is achievable even in low flow conditions. Minimum allowable water depths for salmonid fish vary from country to country, ranging from 100 mm to 304 mm according to the requirements of the target species and life stage Minimum water depth guidelines are generally set for salmonid fish, although the Alaskan guidelines require the minimum water depth to be set for particular target species. If the low-flow water depth allows the passage of the largest fish species in that river system, then it should be passable by all fish

**4. Effect on Vegetation**

Suspended solids have a predominant influence on the compensation point in a water column (the depth at which photosynthesis equals respiration in plants) and are therefore a key determinant in the distribution of submerged aquatic vegetation. vegetation from river-crossing construction sites can influence a number of in-stream processes, such as temperature regulation. so as result it decrease vegetation which is directly affects the food production for marine life

## RESULT AND DISCUSSION

In conclusion, there is demonstrable evidence that, in the absence of careful environmental management, the construction of river crossings has the potential to generate elevated inputs of sediment that may impact adversely on aquatic environments, both in the short and long term. There is, however, a paucity of data regarding long-term effects. Finally, there is a considerable body of literature detailing best practice with respect to the design and construction of watercourse crossings to ensure aquatic connectivity for native species. However, the effectiveness of some measures has not been adequately assessed.

It is also clear from this review that river-crossing construction may, potentially, pose barriers to fish movement. There is little evidence that bridges obstruct the passage of fish. On the other hand, there is ample evidence in the literature to demonstrate how incorrect culvert construction can impede fish passage. This review also highlights the variability of guidelines pertaining to facilitation of fish passage. For example, the maximum allowable water velocity to enable safe fish passage through culverts is shown to vary considerably. This literature review has identified current knowledge gaps relating to the potential impacts on aquatic systems from river crossing construction and the appropriateness of mitigation measures. River crossings do not necessarily have to cause negative impacts and, with careful planning, habitats can be considerably improved

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