RPS

NORTH WESTERN
NEAGH BANN
CFRAM
STUDY
CATCHMENT FLOOD RISK
ASSESSMENT AND MANAGEMENT

North Western - Neagh Bann CFRAM Study

High Level Impacts of Flood Risk Management Methods

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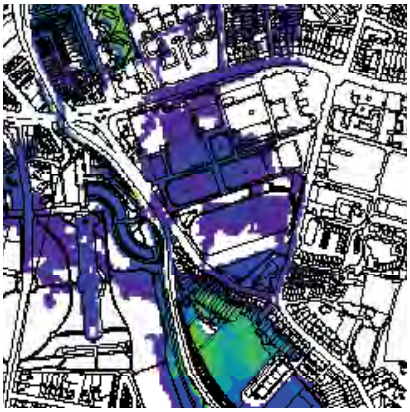

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Photographs of flooding on cover provided by Rivers Agency

High Level Impacts of Flood Risk Management Methods

This document outlines the main potential likely impacts of implementation of the CFRAM flood risk management methods on the general environment. These impacts can be positive or negative.

The purpose of producing this information and requesting feedback from consultees is to develop a streamlined assessment of impacts of flood risk management methods on the general environment, which will be used within the environmental assessments for the CFRAM studies.

These are high-level / strategic impacts and are not site or species specific. This is to reflect the strategic nature of the Flood Risk Management Plans and environmental assessments of the Plans.

Any additional inputs to these positive or negative impacts, that have not already been covered, are welcome.

Feedback, additional impacts and any comments on this information can be provided as follows:

By post	Richard Bingham NWNB CFRAM Study SEA RPS Enterprise Fund Business Centre Ballyraine Letterkenny Co Donegal Ireland
By email	nwnb@cfram.com
Via the national and NWNB CFRAM Study websites	www.cfram.ie www.northwestcframstudy.ie www.neaghbanncframstudy.ie Will be forwarded automatically to the communications coordinator
Via direct consultation with team members at events	The NWNB CFRAM Study communications coordinator and various relevant team members will be on hand at NWNB CFRAM Study events as well as national events.

FRM Method	Likely Positive Impacts (+)	Likely Negative Impacts (-)
Do Nothing No new flood risk management measures and abandon existing defences and maintenance		
Do Nothing	• Unlikely to be significant positive impacts at a strategic level, however there is the potential for local improvements to habitats and biodiversity in the vicinity of previously maintained defences.	• Potential for significantly increased flood risk to human health, properties and infrastructure.
Existing Regime Continue existing flood risk management practices		
Existing Regime	• Unlikely to be significant positive impacts at a strategic level.	• Potential for increased flood risk to human health, properties and infrastructure due to climate change.
Do Minimum Additional minimum measures to reduce flood risk in specific areas. Includes channel or flood defence maintenance works / programme.		
Do Minimum	• Unlikely to be significant positive impacts at a strategic level.	• Unlikely to be significant negative impacts at a strategic level. However method is non-specific.
Maintenance Programme	• Unlikely to be significant positive impacts at a strategic level.	• The maintenance of existing flood defence measures is unlikely to have significant negative environmental impacts upon designated sites; however works may need to be done outside of certain seasons in sensitive areas. • Unlikely to be significant negative impacts at a strategic level.
Planning and Development Zoning of land for flood risk appropriate development, prevention of inappropriate development, and / or review of Local Areas Plan (LAP).		
Planning and Development	• Unlikely to be significant positive impacts at a strategic level, however will prevent future additional flood risk from being	• Unlikely to be significant negative impacts at a strategic level, however will prevent some developments which may curtail

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	created.	economic growth in certain areas.
Building Regulations Regulations on finished floor levels, flood proofing, flood resilience and SuDS.		
Building Regulations	• Unlikely to be significant positive impacts at a strategic level, however will prevent future additional flood risk from being created.	• Unlikely to be significant negative impacts at a strategic level.
Catchment Wide Sustainable Drainage Systems (SuDS) Recommendations for future development drainage systems.		
SuDS	• Slight direct positive impacts through reduction of flood risk and impacts to property and infrastructure.	• Likely to be temporary negative impacts through disturbance and inconvenience to the local population during construction.
Land Use Management (NFM) Runoff Control – Overland flow management through changes in land use and / or agricultural practices. River / Floodplain Restoration - Creation of wetlands, restoration of meanders, in-channel flow retardation, floodplain flow retardation and riparian buffer zones. Coastal Restoration - Attenuation waves and coastal surge through the creation and restoration of natural habitats.		
Runoff Control	• Implementation of runoff control would slow down and store some potential flood waters, which will benefit the downstream population through reduction of flood risk and impacts to property and infrastructure during high frequency flood events. • Done correctly in the appropriate locations, non-structural land use management has the potential to have positive environmental benefits through habitat creation, increased biodiversity and natural flood management. • The creation of habitat and / or land management practices can help to improve attenuation of nutrients and reduce the loss of sediments, leading to improvements in water quality. • By increasing habitats such as woodland and wetland, there is	• If misplaced, non-structural land use management has the potential to be either ineffective or actually detrimental to the local environment, through loss or displacement of native species. • Some areas of productive agricultural land may be lost. • An increase in the wetness of cultivated land and semi-natural grassland ecosystems may increase the prevalence of some livestock pests.

FRM Method	Likely Positive Impacts (+)	Likely Negative Impacts (-)
	potential to increase carbon storage. • Enhancing and restoring wetlands may lead to benefits to habitats and species. • Runoff control may enhance the productivity of cultivated land and semi natural grassland by protecting soils from erosion and loss of nutrients, and through providing a more diverse habitat for pollinators and biological control of pests and disease. • Run off control in drinking water catchments may help to reduce treatment requirements for drinking water. • There may be benefits to freshwater fisheries from improved water quality and reduced sedimentation. • The effects on recreation, wildlife watching and landscape are generally likely to be positive, as runoff control should improve habitat diversity and biodiversity. • The introduction of riparian buffer zones is unlikely to have negative impacts on habitats and species.	
River / Floodplain Restoration	• Reconnection of the river with the floodplain will enhance the natural storage capacity and provide slight direct positive social impacts through reduction of flood risk and impacts to property and infrastructure during high frequency flood events. • Restoration of habitat within the river and floodplain, and reduced erosion of the river bed and banks can help to filter nutrients and reduce sediments; which can lead to improved water quality. • There is the potential for improved fish habitats. • Greater areas of river and floodplain wetland habitat will provide increased biodiversity. • River and floodplain restoration in drinking water catchments may help to reduce treatment requirements for drinking water. • The effects on recreation, wildlife watching and landscape are generally likely to be positive, with improved habitat diversity and	• There is the potential for the direct loss of agricultural land with this method. • The existing ecosystems in the area for restoration will be directly impacted in the short term through a potential change of land use, habitat and hydromorphology. These impacts could be positive or negative in the long term. • If parkland areas are used the land could become unsuitable for some types of recreation, temporarily during a flood event or in the medium to long term through changing the wetness of the land. • There could be reduced seasonal access to riparian areas for recreational activities from floodplain re-connection. • In-stream works can release fine sediments which adversely affect fish spawning gravels.

FRM Method	Likely Positive Impacts (+)	Likely Negative Impacts (-)
	biodiversity. • With improvements to biodiversity and water quality, this method may help to improve WFD status. • With wetland enhancement there may be benefits to the connectivity and health of wetland ecosystems, and there may be benefits to carbon storage. • There may be local improvements in recreational fishing in the area with a more natural river course and improved water quality.	• There is the potential for impacts on the local landscape from this; however these could be positive or negative, depending on the finished look of established vegetation.
Coastal Restoration	• Coastal restoration can attenuate waves and coastal surge through the creation and restoration of natural habitats, reducing the potential flood risk. • Enhancement of coastal natural habitats can help to protect from coastal erosion, provide carbon storage, and help to adapt to future climate change. • Restoration and creation of intertidal areas may help to provide nurseries for fish. • By improving the coastal environment there is likely to be benefits to recreation, amenity and wildlife experience.	• Works could cause disturbance to feeding and breeding birds. • Restoration and creation of intertidal areas could lead to some loss of productive land. • Works could restrict or alter access to coastal areas which could cause short or long term, local negative effects. • In areas of longshore drift, works in one location can have implications for sediment distribution in others. • Beach re-charge could affect sediment sources for offshore sand banks.
Strategic Development Management For necessary floodplain development, with integration of structural measures into development design and zoning.		
Strategic Development	• Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.	• Unlikely to be significant negative impacts at a strategic level.
Upstream Storage Online or offline, single or multiple storage areas, with potential for embankments / engineered walls. Online storage refers to creating a dam and reservoir across the floodplain of a river, often with an outlet control structure such as an undershot culvert or sluices, to control outlet flow, and with an overflow weir and spillway. Offline storage is an area of floodplain that is embanked to prevent or control flooding within the storage area or wash-land during minor events.		
Storage	• There will be slight direct positive social impacts through the	• Online storage dams should not be placed in areas of high

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	regulation of flow and reduction of flood risk and impacts to property and infrastructure. • Recreational access to the waterway for some activities could be improved with sensitive scheme design. • Offline storage areas should ideally be located away from the existing riparian zone and can then provide environmental benefits through the creation of high biodiversity wetlands. • Prolonged flooding in offline storage could increase the sediment store in the floodplain and reduce sediments stored in rivers, reducing downstream sedimentation and potential flood risk.	biodiversity or on migratory routes, therefore not within SACs or SPAs. However if the normal discharge volume is to be maintained they should be able to be placed upstream of an SAC or SPA. • Offline storage areas should not be developed within an SAC or SPA where the designated habitat and / or species are vulnerable to flooding. This method could be further investigated within designated areas that require or are not sensitive to periodic inundation. • Storage is likely to cause or exacerbate the disconnection between the river and the floodplain. • There is the potential for disruption to natural processes, loss of habitat and potentially negative effects on water quality (due to loss of habitat to filter nutrients) and carbon storage. • Erosion can be exacerbated upstream and / or downstream of storage areas with potentially significant negative effects. • There is the potential for a reduction in pollinating services and pest and disease control due to the loss of natural habitat from direct footprint impacts. • Embankment of rivers to create storage areas can result in the loss of natural riparian habitat that filters and removes nutrients from agriculture. • There is the potential for long term changes to land use from direct footprint impacts. • Loss of natural habitat and reduced biodiversity can impact recreational activities like angling and wildlife watching. • Some storage areas may use parkland and recreational grounds which could render the land unsuitable for some types of activities, either temporarily during a flood event, or in the medium to long term through changing accessibility to the area. • Changes to river flow and water levels could affect navigation

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		channels. • Prolonged flooding in offline storage could increase the sediment store in the floodplain and reduce sediments stored in rivers, disrupting the natural sediment regime. • Drinking water quantity may be negatively impacted if using reservoirs for flood storage, as retaining lower water levels could affect water supply. • There is likely to be temporary negative impacts through disturbance and inconvenience to the local population during construction of storage areas.
Improvement of Channel Conveyance Deepening channel, widening channel, realigning long section, removing constraints and / or lining smoothing channel.		
Increase Conveyance	• There will be slight direct positive social impacts from increasing conveyance through the regulation of flow and reduction of flood risk and impacts to property and infrastructure. • Removal of channel constraints provides the opportunity to remove barriers to fish migration. This could improve production of salmon when combined with other river restoration actions. The design of the new structures should build in requirements for migratory fish and to diversify in-stream habitat where possible. • Daylighting culverts may reduce barriers to fish barriers and improve habitats.	• It may be possible to use this method within some designated areas depending on the species and habitats present. Short sections of increased channel conveyance are unlikely to have significant impacts upon species and habitats, however over long sections of river where there may be significant in-channel losses of protected vegetation and habitat this may be unacceptable. The SAC and SPA designation criteria will need to be investigated in this instance for important in-channel habitats and species. • Culverting of an entire AFA has the potential for significant negative environmental impacts within a designated site, as it replaces the natural hydrological and ecological regime with an artificial bypass. Culverting is unlikely to be an acceptable standalone method within a designated site. Culverting however should have no hydraulic impacts upstream of a designated site. • Increasing conveyance modifies the storage and flow of water, causing or exacerbating disconnection between the river and the floodplain. There can be disruption to natural processes, the loss of habitat and potentially negative effects on water quality, due to

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		loss of habitat to filter nutrients, and reduced carbon storage. • There is the potential for increased downstream flood risk. • Erosion can be exacerbated upstream and / or downstream of modified conveyance areas with potentially significant negative effects. • There is likely to be the direct loss of habitat and displacement of species in the vicinity of works, however these may re-establish in the medium to long term. • There is the potential for a reduction in pollinating services and pest and disease control due to the loss of natural habitat from direct footprint impacts. • There is the potential for long term changes to land use from direct footprint impacts. • Loss of natural habitat and reduced biodiversity can impact recreational activities like angling and wildlife watching. • There is the potential for reduced water quality during construction from increased sediments. • There may be temporary negative visual impacts during in-channel works.
Hard Defences Fluvial flood walls or flood embankments. Rehabilitate and / or improve existing defences Tidal Barrages Coastal Flood walls		
Fluvial flood walls or flood embankments	• Hard river defences can deliver benefits by regulating water flow and reducing flood risk; therefore protecting human health, properties and infrastructure. • Depending on their design, some defences can improve access for some types of recreation.	• Hard defences can interfere with natural process, by causing some or all of the floodplain to be disconnected from the river, which can lead to the loss of natural habitat to capture, filter and recycle nutrients or pollutants. This can lead to a reduction in water quality.

FRM Method	Likely Positive Impacts (+)	Likely Negative Impacts (-)
		• There is likely to be a direct loss of natural and semi-natural habitat in the direct footprint and vicinity of the defences. There may be indirect negative downstream impacts from sedimentation during construction. • Erosion may also increase either side of the defences due to changes in river processes. • Defences could impact negatively on river morphology and sediment dynamics, and affect WFD status and classification. • Loss of natural habitat and biodiversity can reduce the quality of the environment for recreation and wildlife watching. • Within the urban landscape, direct defences have potentially negative effects through disrupting the setting and view of the river and floodplain. • Defences may alter the setting of heritage sites. • There is the potential for downstream increased flood risk. • Direct defences have the potential for negative effects on freshwater fisheries due to the loss of in river and riparian habitat and sedimentation. • There may be temporary negative impacts through disturbance and inconvenience to the local population during engineering works. • Flood walls and embankments are unlikely to have negative impacts upon designated sites, unless the footprint of the structure is directly on the designated feature, or if they cause a greater flood hazard downstream of the feature in a vulnerable designated area.
Tidal Barriers	• Tidal barrages can deliver benefits by regulating water flow and reducing flood risk, therefore protecting human health, properties and infrastructure.	• Tidal barrages should ideally not be placed within a designated site, however probably all estuaries where a tidal barrage could be incorporated within Ireland are designated Natura 2000 sites. This measure has the potential to have significant ecological impacts, particularly on migratory fish and other water dependent

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		species. • New tidal barriers could have potentially significant negative effects on water quality (including morphology) and erosion. • Tidal barriers could impede fish passage and impact on upstream protected sites.
Coastal Flood walls	• Hard coastal defences can deliver benefits by regulating water flow and reducing flood risk, therefore protecting human health, properties and infrastructure.	• New hard coastal defences on undeveloped shoreline or tidal barriers could have potentially significant negative effects on water quality, coastal morphology and erosion. • In areas of longshore drift, defences in one location can have implications for sediment distribution in other areas. • Coastal defences may reduce access for recreational activities. • There are potential negative visual effects on urban and coastal landscapes. • There are potential negative visual effects on the seascape from artificial structures offshore or on the beach. • Flood walls and embankments on coastal areas should not be on protected habitats and cannot alter coastal processes where a protected habitat requires inundation.
Rehabilitation of Existing Defences	• Changes to existing defences could potentially deliver significant positive environmental effects, for example, by setting back defences from the shoreline or river. • Sensitively rehabilitated defences may help to improve amenity, particularly if the shoreline is already modified.	• Rehabilitation of existing defences is unlikely to have negative impacts upon designated sites as the structures currently exist, have an established footprint and have an established hydraulic impact.
Relocation Abandoning existing properties and relocating to existing or new properties outside the floodplain.		
Relocation	• Reduced flood risk to human health and properties.	• Potential for direct, significant, long term social impacts to those required to relocate. These impacts could however be positive or negative depending on the occupant's attitude to relocating.

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		There is the potential for indirect, significant social impacts to residents through fragmentation of neighbourhoods. There is the potential for indirect, significant social impacts to relocated commercial properties if old customers do not frequent the new premises. • There are unlikely to be any significant impacts on the environment from the relocation of properties/infrastructure away from flood risk areas, provided the new properties / infrastructure are not relocated to environmentally sensitive areas.
Flow Diversion Diversion of Flow - Realignment of entire river, diversion channel out of river basin and/or bypass channel to return flow downstream. Overland Floodways - Using roads or linear floodways to convey flow to a determined discharge point.		
Diversion of Flow	• There will be direct positive social impacts from diversion of flow through the reduction of flood risk and impacts to property and infrastructure.	• Flow diversion includes realigning the entire river or creating by-pass channels. They are usually implemented in the immediate vicinity of the AFA and any impacts are likely to be localised. There will however be direct negative impacts on local existing habitats in the footprint of the diversion channel. • Full diversion of a watercourse should not be proposed within a designated site, as is likely to impact upon the designation criteria. • There should be limited impact from bypass channels if the normal flow in the original channel is maintained and the bypass channel is not created in a habitat that is sensitive to flooding. • Diversion of flow may just transfer the flood risk to another location.
Overland Floodways	• There will be direct positive social impacts from using overland floodways through the reduction of flood risk and impacts to property and infrastructure.	• Overland floodways should not be proposed within designated sites where the designated habitat and / or species are vulnerable to flooding, as there is the potential for significant negative environmental impacts during a flood event. This measure may be further investigated within designated areas

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		that require or are not sensitive to periodic inundation. • Overland floodways may just transfer the flood risk to another location.
Other Works Minor raising of existing defences / levels, infilling gaps in defences, site specific localised protection works, etc.		
Other Works	• Unknown	• Unknown
Site Specific Protection Works	• Unlikely to be significant positive impacts at a strategic level.	• Unlikely to be significant negative impacts at a strategic level. However method is non-specific.
Flood Forecasting Monitoring rain and flows and alerting relevant recipients of flood risk likely to occur.		
Flood Forecasting	• Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.	• Unlikely to be significant negative impacts at a strategic level.
Public Awareness Make public aware of risk and advice on measures to protect themselves and properties.		
Public Awareness	• Unlikely to be significant positive impacts at a strategic level, however will reduce flood risk to human health.	• Unlikely to be significant negative impacts at a strategic level.
Individual Property Protection Flood proofing, flood gates, capping vents and / or resilience measures.		
Individual Property Protection	• Property level protection may provide positive impacts to those provided with protective equipment by giving them more peace of mind. There will be positives for the public that can protect themselves from small flood events, reducing or even eliminating damages that would otherwise cause disturbance and inconvenience.	• Unlikely to be significant negative impacts at a strategic level, provided property protection does not impact on protected structures or monuments and their setting.