

# Fish Migration River

Layman's report



**Co-funded by  
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*Artist's Impression Fish Migration River by Feddes/Olthof-Landschapsarchitecten*



## Chapter 1

# Why the Fish Migration River?

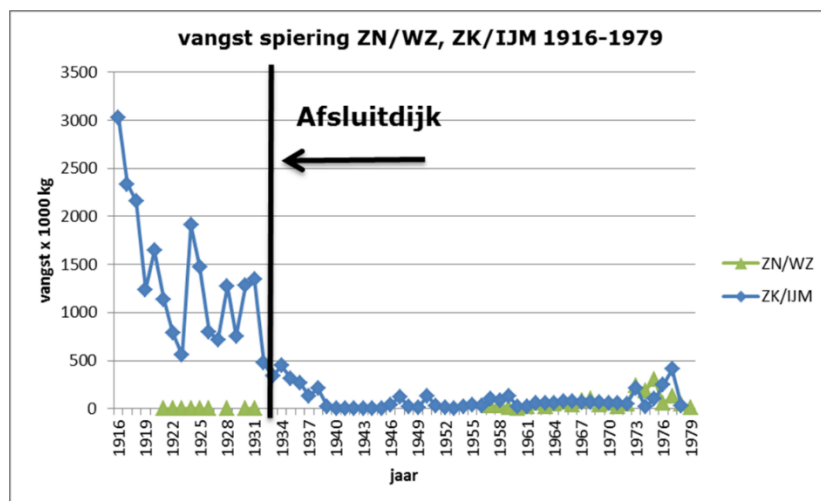
The Afsluitdijk, which was completed in 1932, separated the Wadden Sea from the IJsselmeer. That made the Netherlands safer, but it was a disaster for the natural environment. Migratory fish such as salmon, eel and sturgeon were no longer able to find their way from salt water to fresh water. And birds lost an important habitat where they could forage, rest and breed. The **Fish Migration River** was conceived to solve that problem. It is a unique passage through the Afsluitdijk, enabling fish to swim freely between sea and lake, day and night, throughout the year. Within this major project the **LIFE Fish Migration River project (LIFE NAT/NL/000155)** focuses on nature restoration. In particular, LIFE pays for and supports the measures that enhance the ecological value:

- restoration of the natural transition from salt water to fresh water (estuarine conditions)
- creation of a resting place (high-water refuge) for birds in the Wadden Sea
- better conditions for migratory fish and therefore more food for birds
- monitoring and knowledge sharing, so that this project can also set an example for other places in Europe.

### 1.1 Problem definition

The construction of the Afsluitdijk caused the estuary – the transition zone from salt water to fresh water – to disappear. This was an important link in the life cycle of many migratory fish. The lack of this transition made it harder for them to breed or survive. For birds too it meant a loss of food sources and suitable places to nest.

Fish passages and fish-friendly locks are of only limited help. There is therefore a need for **natural river landscaping** that also continues to function in spite of climate change and rising sea levels.



Line diagram: catch of Smelt before and after the build of the Afsluitdijk

## 1.2 Objectives

The objectives of the LIFE project are:

- to restore natural migration routes for migratory fish such as salmon, Allis shad, sturgeon and eel
- to improve the availability of food for birds in the IJsselmeer area
- to enlarge the habitat for birds by creating a resting place (high-water refuge) in the Wadden Sea and new riparian zones in the IJsselmeer
- to demonstrate a **climate-proof solution** that also functions in the event of altered river flows and rising sea levels
- to carry out monitoring and communication, so that knowledge and experience can be widely shared.

## 1.3 Contribution to national and international goals

This LIFE project contributes to:

- **national goals:** carrying out Natura 2000 management plans for Wadden Sea and IJsselmeer, restoring biodiversity and implementing the Water Framework Directive.
- **European goals:** improving the conservation status of species that feature in the Birds and Habitats Directives, contributing to the Natura 2000 network and developing a climate-robust solution for fish migration.
- **international cooperation:** the knowledge gained here can be transferred to more than 200 similar locations worldwide.

*Photo from space - Afsluitdijk*



## Chapter 2

# How does it work?

The Fish Migration River is a winding river, several kilometres long, that runs straight through the Afsluitdijk. The river follows the tides of the Wadden Sea and has a variety of flow speeds, so the various species of migratory fish can gradually become accustomed to the transition from salt water to fresh water. Innovative valves ensure that the hinterland remains protected in the event of extremely high water levels.

Within the LIFE project the emphasis is on the **natural landscaping** of this system: a transition from salt water to fresh water that fish and birds can make use of



*Video: How does the Fish Migration River work?*

## 2.1 Requirements

The following basic principles apply to the LIFE part of the project:

- **Fish migration:** a permanent, natural connection that helps migratory fish pass through the Afsluitdijk.
- **Flood risk management:** the safety of the hinterland is always of paramount importance; the river has been designed in such a way that this is not endangered.
- **Estuarine conditions:** a wide transition zone where fish can gradually get accustomed to the change from salt water to fresh water.
- **Habitat for birds:** creation of a resting place (high-water refuge) and new riparian zones, giving birds more places to rest, breed and forage.

- **Climate resilience:** the river continues to function in spite of rising sea levels and altered river flows.

## 2.2 Design and structure

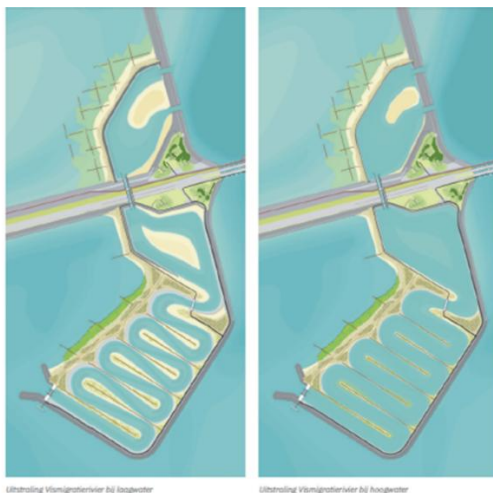
The design and structure of the Fish Migration River have been meticulously planned to follow the natural tides of the Wadden Sea, to make use of sustainable materials, and to apply innovative techniques to facilitate the fish migration. The LIFE project contributes to the ecological landscaping of the river. That means:

- **Location:** the Fish Migration River is being constructed at Kornwerderzand, on the Frisian side of the Afsluitdijk.
- **Structure:** the winding river follows the natural tides of the Wadden Sea.
- **Following the current:** at the entrance to the Fish Migration River the scour sluice complex at Kornwerderzand flushes freshwater from the IJsselmeer into the Wadden Sea. This is important because it helps migrating fish to find the Fish Migration River.
- **24/7 Open for fish:** the guiding principle is that the Fish Migration River is always open for the passage of fish, except in the event of extremely high water levels or an excessive high salt content in the river. Innovative valves then temporarily close off the river.
- **Resting place for birds:** creation of a low sandbank, suitable as a resting place (high-water refuge) for birds in the Wadden Sea.
- **Materials:** use has been made of natural and recycled materials, such as sand and reed, that provide a natural habitat for fish and birds.

## 2.3 Innovations

This LIFE project shows how we **build with nature**. Significant innovations are:

- **Tides:** the Fish Migration River makes use of tides (ebb and flow) to simulate the natural current. An estuarine system that adapts to climate change and will therefore continue functioning in the future.
- **24/7:** extending the migration window for fish: not a couple of minutes per day, but 24 hours per day throughout the year.
- **A resting area in the Wadden Sea** for vulnerable species of birds.
- **Monitoring and communication** to show what works and to inspire other countries.



*Artist impression Fish Migration River: differences between the tides (ebb and flow)*

## Chapter 3

# Sustainability and circularity

The building of the Fish Migration River is a major project with a lot of soil and materials. The choice of **recycling and circular construction** is therefore a conscious one. That means wasting as little as possible and reusing materials. Not only is this good for the environment but it also causes fewer CO<sub>2</sub> emissions.

This is important for the LIFE project because it shows how you can combine nature restoration and sustainable construction.

### 3.1 Examples of recycling

- **Rubble:** stones that were left over after the Afsluitdijk was reinforced have been used for the riverbed and dams.
- **Sand:** sand from the fairway at Kornwerderzand has been used in the creation of the river.
- **Soil:** soil that was left over after the widening of the N31 and the reinforcement of the dyke alongside the Afsluitdijk has been reused.
- **Reed:** reed from the Makkumer Noordwaard has been replanted on the banks of the Fish Migration River.

This approach has made the river not only an ecological connection but also an **example of circular construction**.



*Photo: Successful reed transplantation on the western side of the Fish Migration River*

## Chapter 4

# Cooperation and financing

The Fish Migration River is a project that could not have gone ahead without cooperation between many parties. The LIFE project is an important part of that. LIFE finances the nature conservation measures and demonstrates how European support can contribute to restoration projects that are important both locally and internationally.

### 4.1 Partners and roles

Various organisations are partners in this project:

- **Province of Fryslân:** client and coordinator of the project.
- **Waddenvereniging:** initiator and custodian of the natural environment in the Wadden Sea.
- **It Fryske Gea:** nature conservationist, involved in landscaping and management of the area.
- **Sportvisserij Nederland:** represents the recreational fishing sector and the commercial fishing sector.
- **NetVISwerk:** organisation that represents the interests of the small coastal and inland fishing sector.
- **Blauwe Hart Natuurlijk:** coalition that endeavours to keep the IJsselmeer area healthy.

Working in partnership, these parties take care of the technical and ecological elements. The **LIFE project** puts the emphasis mainly on the nature restoration and monitoring measures

### 4.2 Contractors

Contractors play a big role as well:

- **Levvel (Rijkswaterstaat):** created the passages and swim-in openings in the Afsluitdijk.
- **IJsselmeerwerken (Van Oord & BAM Infra):** made the contours on either side of the Afsluitdijk.
- **Boskalis:** realised the winding river itself.

This collaboration ensures that the technical implementation is in line with LIFE's ecological goals.

## 4.3 Financing

The total costs amount to around **80 million euros**. **LIFE** contributes to the nature conservation measures by providing a **grant of 3.5 million euros**. Other financial backers are:

- Provinces of Fryslân and Noord-Holland
- Central government
- The Waddenfonds (for research and monitoring)
- The Nationale Postcode Loterij.

The contribution from LIFE to the overall sum is modest but crucial: it makes the **ecological core of the project** possible and reinforces the international exemplary function.

*Photo: Happy Fish on World Fish Migration Day at the Afsluitdijk*



## Chapter 5

# Scientific research and monitoring

The Fish Migration River is unique in the world, but there are around 200 similar locations worldwide. Consequently, the Fish Migration River also serves as a **testing facility for scientific research** into the behaviour of migratory fish. After completion of the project, this research will be carried out in partnership with the Wadden Academy and will be financed partially by the Waddenfonds. The experiences gained from the Fish Migration River will be shared and applied at other locations. There is a great deal of international interest in the knowledge and experience gained.

The LIFE project puts great emphasis on monitoring and knowledge sharing. That is important, as the results need to be usable for European nature restoration across the board.

### 5.1 Research questions

The scientific research into the Fish Migration River focuses on the behaviour of migratory fish, the impact on biodiversity and the contribution to the recovery of fish populations worldwide.

- How do migratory fish use the Fish Migration River and the estuary?
- What effects does the river have on fish stocks and biodiversity in the IJsselmeer and the Wadden Sea?
- What effects do the resting places for birds in the Wadden Sea and the IJsselmeer have on bird populations?
- How does this project contribute to the restoration of species in other places in Europe?

### 5.2 Monitoring

The **LIFE project** carries out monitoring in accordance with a fixed plan:

- Fish: counts and measurements of species such as sea lamprey, European river lamprey, salmon, Allis shad, sturgeon and eel.
- Water quality: checks on salt content, water flow and ecological conditions.
- Birds: counts at the resting place (high-water refuge) for birds in the Wadden Sea and in the new riparian zones of the IJsselmeer.
- Ecosystem: effects on the food chain and the correlation between species.

All the results are shared in reports, at meetings and via communication campaigns, so that they can be used for other projects.

## Chapter 6

# Benefits for ecology and environment

The Fish Migration River plays a crucial role in the restoration of the ecological balance in the area. The **LIFE project** provides major benefits for the natural environment in and around the Afsluitdijk. Restoring the connection between sea and lake is to the benefit of fish, birds and plants. In addition, the entire ecosystem becomes stronger and more resistant to change.

### 6.1 Ecological benefits

The Fish Migration River contributes to a healthy water quality, increased biodiversity and an improved habitat, all of which are essential for the ecosystem.

- **Healthy water:** the Fish Migration River contributes to an improvement in the water quality in the IJsselmeer and the Wadden Sea.
- **For fish:** species such as salmon, eel, Allis shad and sturgeon will get access once again to their spawning grounds. It is expected that, within five years of completion, 70% of the fish that now wait at the locks will be able to use the river.
- **For birds:** the presence of more fish in the IJsselmeer will provide more food for birds such as the common tern, the black tern and the cormorant. The populations of these species will rise by 5 to 10%.
- **Habitat:** there will be 23 hectares of new natural environment in the IJsselmeer, and a resting place of 2.5 hectares in the Wadden Sea specially for terns, eider duck and ringed plover.

### 6.2 Long-term effects on the environment

The long-term effects of the Fish Migration River comprise restoring ecosystems, improving water quality and supporting biodiversity, thereby contributing to a resilient and sustainable environment. In the long term, the **LIFE project** will provide the following benefits:

- **Restoration of ecosystems:** fish will once again be able to follow their natural cycle, thereby increasing the biodiversity.
- **Better water quality:** more natural dynamics will make the water healthier for fish and plants.
- **Stronger ecosystem:** having more fish, birds and plants will make the entire area more resilient and more resistant to climate change.
- **International exemplary function:** this project shows how a climate-resistant solution for fish migration can be implemented. It can be applied in more than 200 similar places across the world
- **International exemplary function:** the Fish Migration River serves as an example to other projects worldwide that are endeavouring to restore fish migration routes and improve the ecological balance.

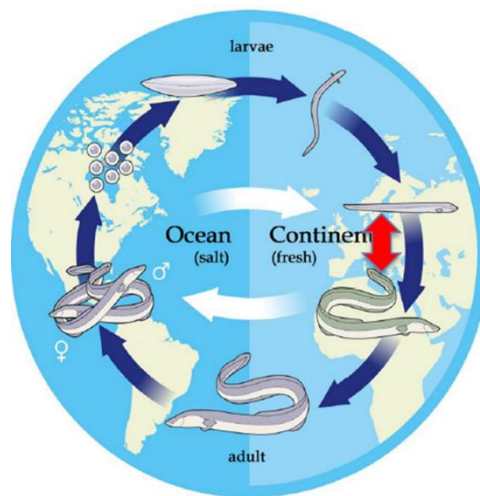
## Chapter 7

# Example of migratory fish species

The Fish Migration River is being created for **migratory fish**: species that spend some of their life in the sea and some in fresh water. Without a passage they cannot complete their life cycle. The **LIFE project** focuses mainly on species that feature in the European Bird and Habitats Directives:

- **European eel**
- **Atlantic salmon**
- **European river lamprey and sea lamprey**
- **Allis shad and Twait shad**
- **European sea sturgeon**
- **Freshwater whitefish**

Other species benefit too, such as the European smelt and the three-spined stickleback, which are important food for birds.



*Illustration: life circle of European Eel from Caribbean to Africa, eventually Europe*

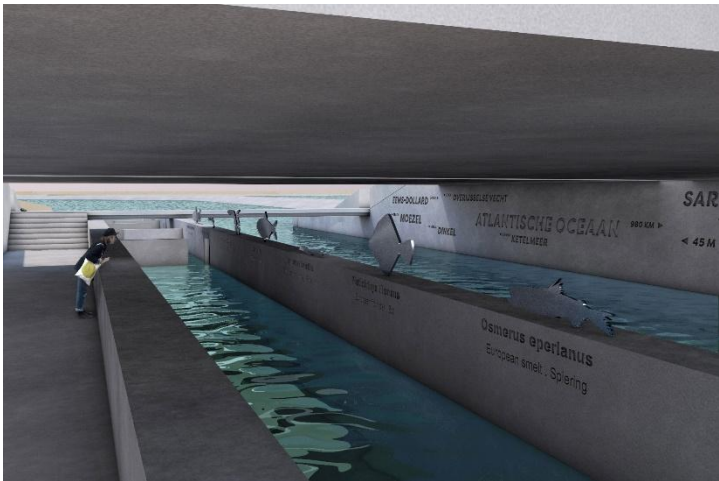
### Life cycle of European eel

Take the European eel: it begins life as an elver in the Sargasso Sea (near the Caribbean), floating for months in the Gulf Stream before reaching Europe. Young eels want to move from the sea to fresh water to further their development. For many decades they have been unable to do so because of the Afsluitdijk. The Fish Migration River will allow them once again to swim safely into the IJsselmeer, mature there and later return to the sea to breed.

This restoration gives many species a good chance of survival. Thanks to the Fish Migration River, experts expect populations of the target fish species to grow by around 5% per year.

# Perception and education

The Fish Migration River is not only a nature conservation project but also a place where humans **can learn and experience**. Landscape architect and artist Bruno Doedens developed a plan to bring nature and culture together for visitors. It reveals how important migratory fish are and what this project means for nature and climate. The **LIFE project** supports this by financing education and communication. The Fish Migration River will be accessible to the general public in the future. While construction is still ongoing, the project can be visited as part of a guided tour.



*Left: artist impression, Doedens. Right: Actual passage of Fish Migration River*

## 8.1 Activities and excursions

The Fish Migration River offers a variety of activities and excursions to give visitors information and to involve them in the project.

- **Walking excursions:** organised walks along the river, where guides provide information about migratory fish and birds.
- **Exhibitions:** in the Afsluitdijk Wadden Center you can enjoy interactive presentations and even a VR experience to see how a fish swims through the river.
- **Group events:** special programmes for schools, businesses and groups of visitors, with boat trips or lectures.

## 8.2 Educational programmes

- **Lectures and classes:** information about migratory fish, nature restoration and how the Fish Migration River works, specially developed for youngsters and students.
- **Art and nature:** projects such as the *Blije Vissen Veld*, an art installation that shows the ebb and flow of the tides.
- **International exemplary function:** through communication and education the LIFE project also enables other countries to see how nature and engineering can work together.

## Chapter 9

# Communication milestones

From the very beginning, the Fish Migration River has drawn a lot of attention from the press, the political world and the general public. Communication and education play a big role in the LIFE project. It is not only about constructing the river; it also shows what the significance is for nature, climate and society. Thanks to LIFE, extra attention is being paid to the **exemplary function of the project**. For instance, the knowledge gained is being shared with other countries and organisations.

We have organised events, including several World Fish Migration Days, we have attended congresses and arranged press trips. Furthermore, we communicate on a structural basis via our website and social media and have now built up a tremendous target audience.

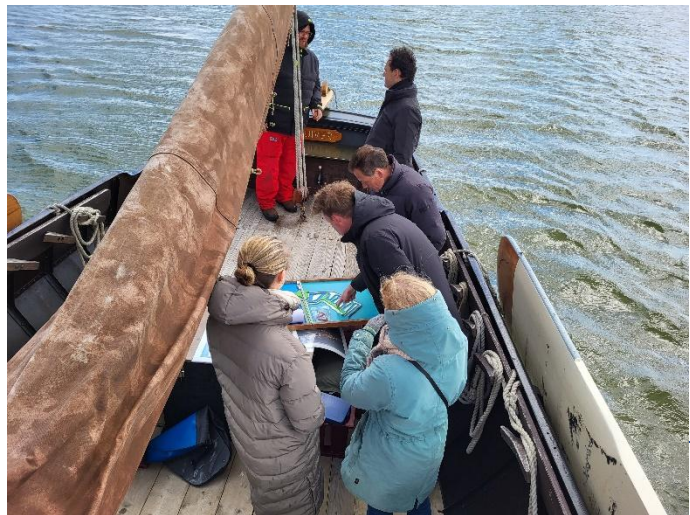
### Press and media

- Press conference start of construction (January 2021) [Vismigratierivier officieel van start - De Afsluitdijk](#) (only in Dutch)
- Press conference on reed transplantation (March 2021) [Vismigratierivier krijgt riet van Makkumer Noordwaard - De Afsluitdijk](#) (only in Dutch)
- Fish Migration River breaks through Afsluitdijk (January 2022) [Doorbraak Vismigratierivier - De Afsluitdijk](#) (only in Dutch)
- Production of innovative valves [Innovatieve schuiven in de Vismigratierivier houden extreem hoogwater tegen - De Afsluitdijk](#) (only in Dutch)
- Installation of 3D printed fishes (June 2023) [Beleef de Vismigratierivier met de BlijjeVis - De Afsluitdijk](#) (only in Dutch)
- Visit by author Frank Westerman for TV programme Nieuwsuur: [Frank Westerman reist Willem Barentsz achterna](#) (only in Dutch)
- Explainer NU.nl: World first Fish Migration River (summer 2024) [Wereldprimeur bij de Afsluitdijk | NU.nl | Explainer](#) (only in Dutch)
- International press trip via NBTC (summer 2024): visit by journalists from Germany, France and the UK. Lots of articles in major newspapers and blogs as a result.
- Communication moment Wadden side completed (November 2024) [Vismigratierivier stap verder: riviermonding afgerond - De Afsluitdijk](#) (only in Dutch)
- Podcast EU in Business – Fish Migration River (December 2024) [EU in Business #2: Herstel voor trekvis dankzij de Vismigratierivier 12 december 2024 - New Business Radio | Podcast on Spotify](#) (only in Dutch)

### Events organised and congresses attended

- World Fish Migration Day: 2018 and 2022 (as international host location)
- Free Flow Conference (international) 2024

- Floriade – international horticultural exhibition (2023)
- Research Day Wadden 2023
- Stakeholder meeting Afsluitdijk – an annual informative meeting for the principal stakeholders (around 100 people) – 2020 to 2025



De Afsluitdijk  
21 november 2024 · 🌐  
Een voordeur naar het achterland 🇳🇱  
D... Meer weergeven



Promoot dit bericht om het bereik van De Afsluitdijk te vergroten.

Bericht promoten

Kristel Meijde en 1,4 d. anderen

271 opmerkingen 96 keer gedeeld

# Chapter 10

## Evaluation

The Fish Migration River is still under construction. It is expected to open in 2027. But even today there are already visible results and lessons to be learned from the LIFE project.

### 10.1 Successes

- **Smart recycling:** materials such as sand, stone and reed have been reused, saving both money and CO<sub>2</sub>.
- **Subprojects carried out:** for example, the bird island on the IJsselmeer side and the estuary on the Wadden Sea side.
- **Communication and education:** through LIFE the ecological goals have been made more visible to a wide audience.

### 10.2 Lessons learnt

- **Legislation:** rules for water safety and nature can sometimes conflict. The Fish Migration River shows that new legislation might be needed to make projects like this one easier.
- **Cooperation:** close cooperation between ecologists, contractors and policymakers is indispensable when combining ecology and technology.

### 10.3 Future steps

- **Completion of construction** in 2026/2027.
- **Monitoring and studying** fish, birds and water quality as soon as the river is open.
- **Management and maintenance** of the river and the resting place (high-water refuge) for birds, with structural financing by the province of Fryslân.

### 10.4 Analysis of (expected) benefits

The LIFE project will provide lasting benefits:

- **Recovery of fish populations:** it is likely that 70% of the fish that now wait at the locks will be able to use the river.
- **Growth in bird populations:** more food and new habitats will result in a rise of 5 to 10% in the populations of species such as the common tern, the black tern and the cormorant.
- **New natural environment:** 23 hectares in the IJsselmeer and 2,5 hectares in the Wadden Sea.
- **Circular working:** smart use of materials saves time, money and CO<sub>2</sub>.

- **Climate adaptation:** a solution that continues to function in spite of rising sea levels and altered river flows.

*'The construction of the Fish Migration River is pioneering work, from start to finish! This project would never have been carried out without flexibility and good cooperation between all the parties involved. Nowadays we work with nature, whereas construction work in 1928 took place against nature. A freshwater/saltwater connection on such a large scale – and in a primary flood defence system – is a first in the Netherlands. The experiences gained here can be applied worldwide in around 200 similar situations for migratory fish. It is a remarkable fact that we are making a hole in a primary flood defence system to create a passage for migratory fish. And when you stand in that coupure, you can really see how impressive it is. It is genuinely an experience, and one that everyone can enjoy, because the Fish Migration River will be accessible to the public. Walk through the coupure, look out over the IJsselmeer and visit the Fish Migration River!'*

– Wiepkje Elsinga, project manager, Province of Fryslân





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Fish Migration River Afsluitdijk