OSNEY LOCK HYDRO

The Fish Pass

HERITAGE FUND

A healthy river

- As a riverside community the **health of the river** is important to the people of **Osney Island**
  - A river is an **ecosystem:** it is home to **plants** and wildlife from **plankton** to **fish** to **river birds** and even **mammals**
  - Can you identify some of the **wildlife** you might find **living in** and **around** the river?
  - 2 or more types of **fish,** 2 or more types of **bird and** 2 or more types of **mammal**

OSNEY LOCK HYDRO

The importance of our rivers

Human impact

- Over the centuries **human activity** has had an impact on our river ecosystems
  - Emptying **waste** into the water
  - Introducing **non-native** species
  - **Changing** surrounding landscapes
  - What type of **changes to the landscape** do you think would effect river **ecosystems**?

OSNEY LOCK HYDRO

Industry

- 1760 - 1840 saw a new era of **innovation** and **manufacture**
- **Factories** were built and filled with new **machinery** and workers
  - What do we call this **period of time**?
  - Factories were often sited near waterways
  - Why do you think this was and what **impact** do you think it had on the rivers?

OSNEY LOCK HYDRO

Task 1: River health

OSNEY LOCK HYDRO

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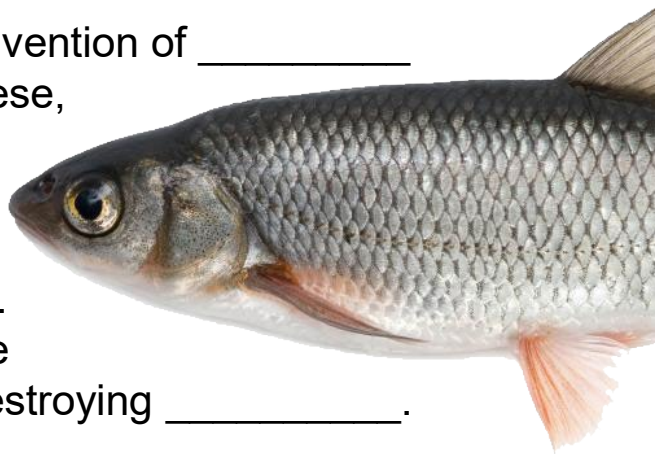

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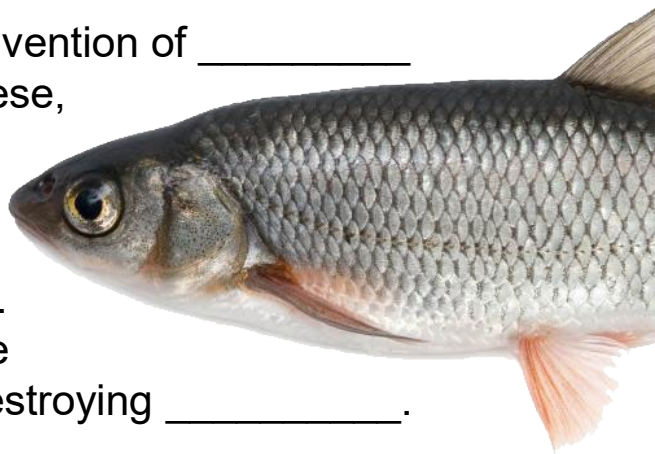

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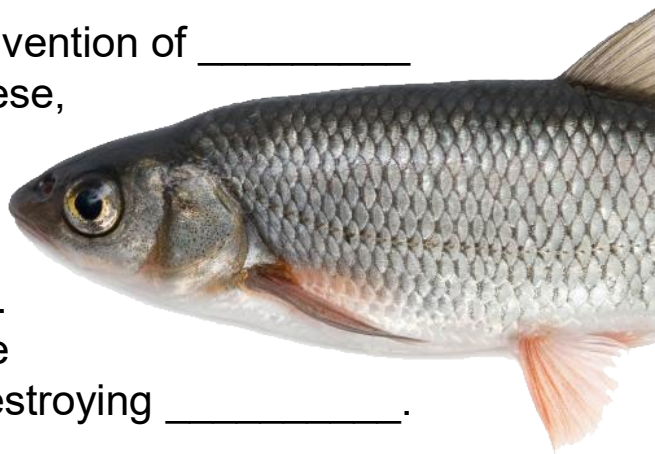

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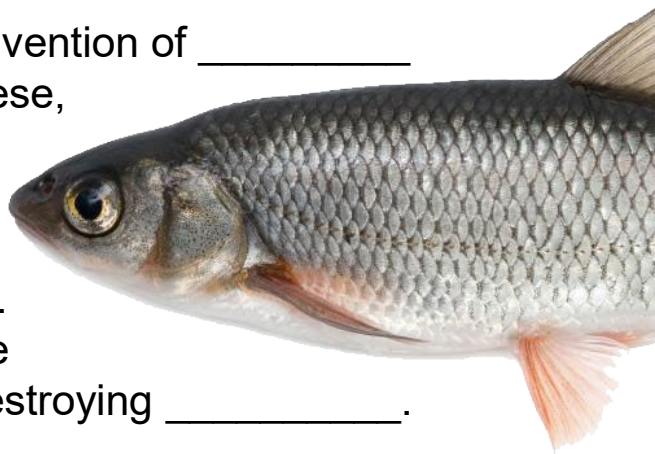

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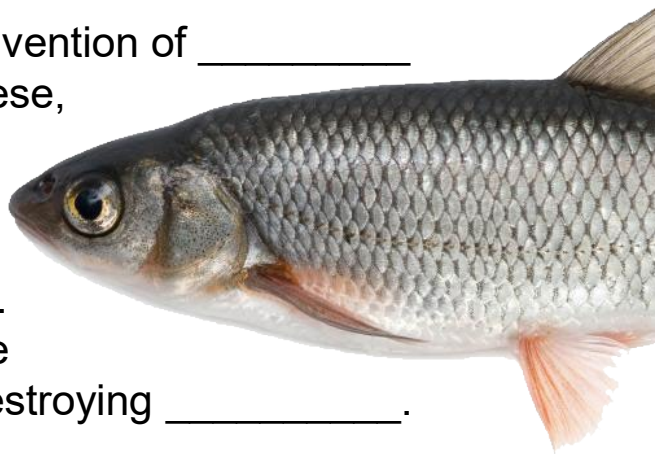

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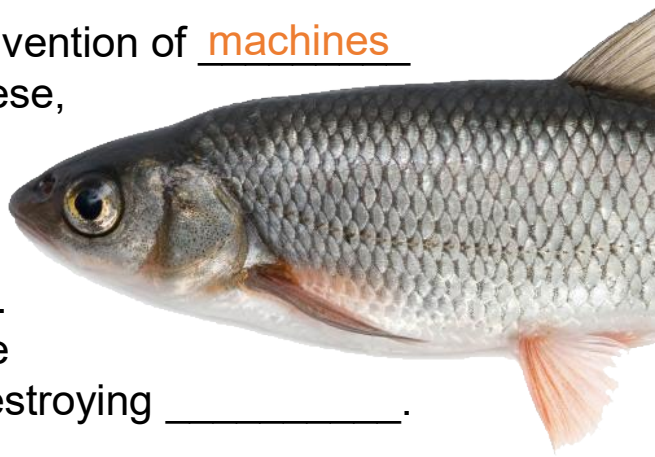

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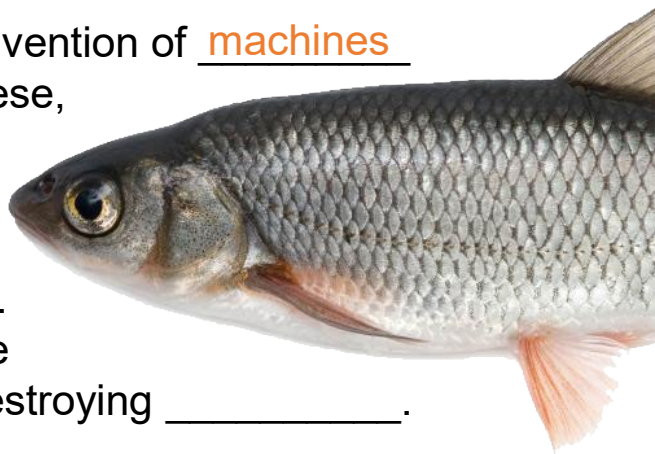

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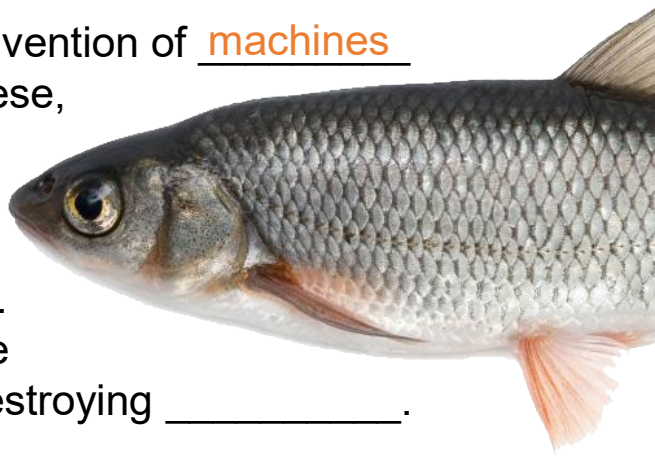

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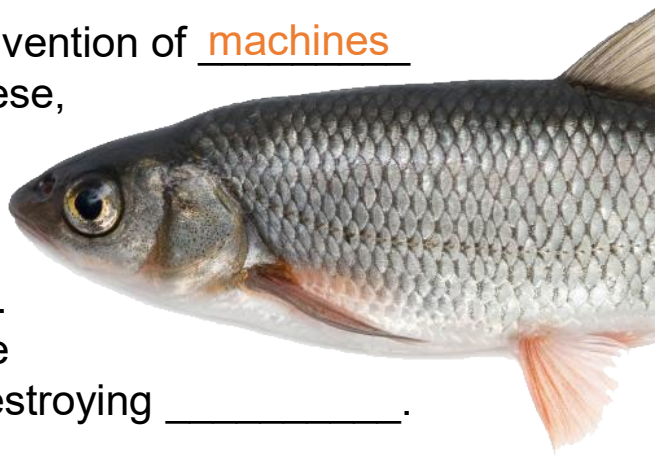

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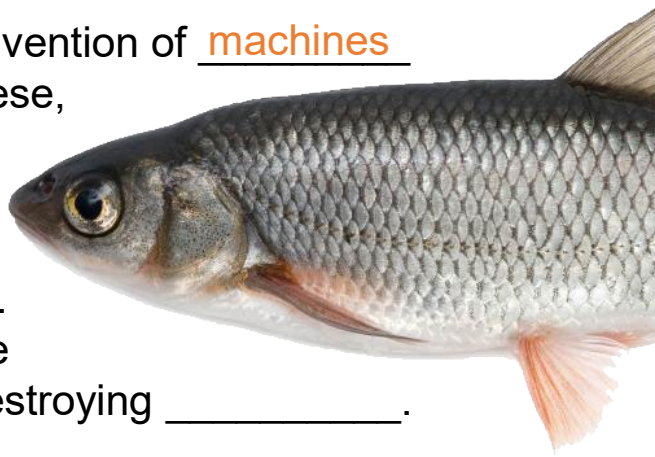

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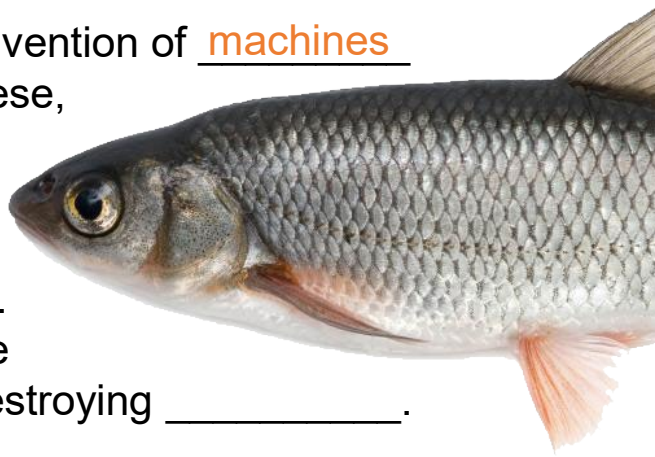

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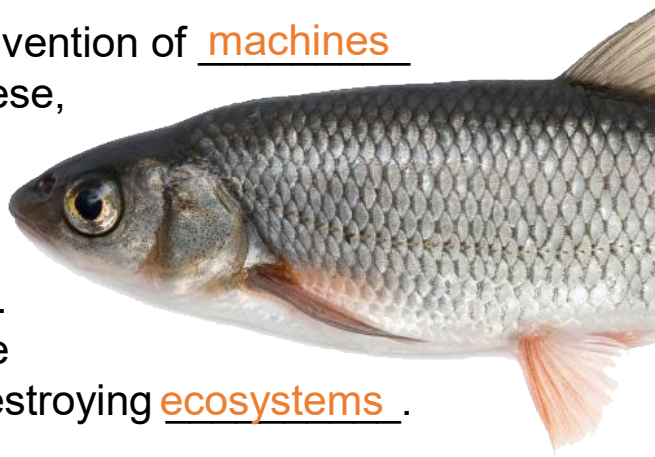


Wildlife in the Thames

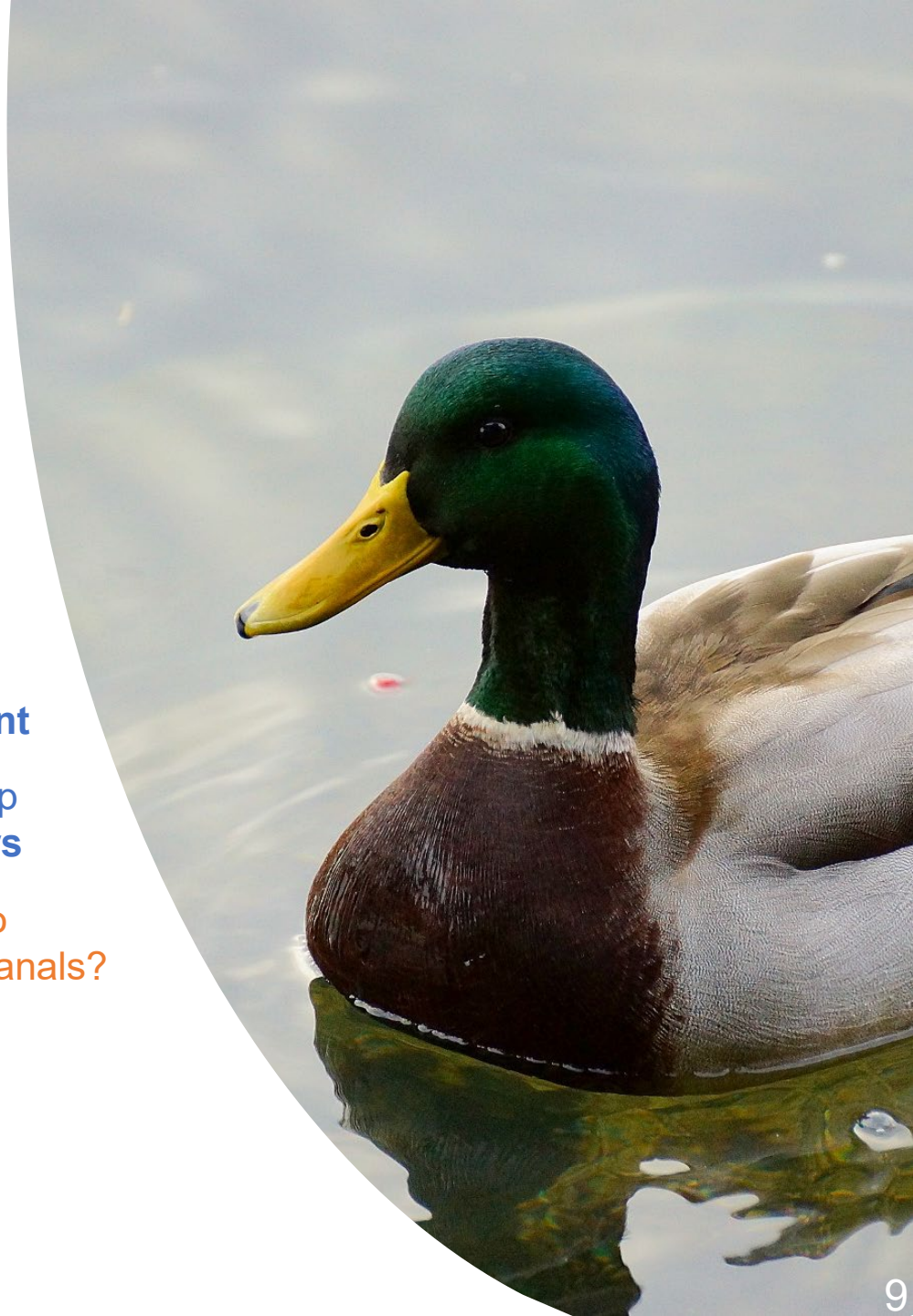
Mammals

- Many **mammals** make their home in and around the river
  - Water voles, otters and bats take advantage of **freshwater wetlands**
  - Recently **beavers** have been **re-introduced** into some UK rivers
  - How do you think beavers **positively affect** the river environment?
  - Seals, porpoises and bottlenose dolphins may even be seen in some **tidal river estuaries**

OSNEY LOCK HYDRO

Dipping in

- A trip to the river would not be the same without familiar **birds**
  - Swans, ducks and geese are all common: some species are **resident**
  - Others **overwinter** in the UK or stop off on their long **migratory journeys**
  - What **other birdlife** can we hope to see on and around UK rivers and canals?



OSNEY LOCK HYDRO

What lies beneath!

- For many insects, crustaceans and other invertebrates, the river is vital to their **life cycle**
  - Snails, shrimps, limpets, crayfish and even crabs are found in **freshwater**
  - Dragonflies are just one of the insects that spend their **larval stages** underwater
  - What role do dragonflies play in the **food chain** within the river ecosystem?

OSNEY LOCK HYDRO

Fish

- We may not always see them but fish play a very **important** part in the **river's ecosystem**
  - From tiny minnows to bream, tench, pike, roach, perch, carp and barbel
  - Fish are particularly affected by any **structural** or **chemical** changes to rivers
  - In the last century certain species have **declined in number** and some **species have even been lost entirely.** **W**hy do you think this may be?

OSNEY LOCK HYDRO

Migration

- Fish **migrate** in search of suitable places to **spawn,** to find **food** and new **territories**
  - Some, like **trout,** spend their whole lives moving through one waterway
  - **Salmon** are born in rivers, grow up at **sea,** then swim back **upriver to spawn**
  - What type of **manmade structures** might get in the way of these journeys?

OSNEY LOCK HYDRO

Barriers

- **Manmade structures** restrict movement resulting in species loss and **loss of diversity**
  - **Weirs** create a **barrier** to fish swimming **upstream**
  - Locks can **delay** or even **prevent** fish from **swimming downstream**
  - Can you find out how many **locks** there are on the **non-tidal** River Thames between Kemble and Teddington?

OSNEY LOCK HYDRO

Making positive changes

A helping hand

- To help fish to swim **upstream** and **downstream**, we can install fish **passes, ways** or **ladders**
  - The **type** of fish pass selected will depend on a range of **factors**
  - These include fish **numbers**, **species** and the **severity and length of slope**
  - In some situations '**fish lifts/elevators**' are installed. In what **situations** do you think these might be more helpful?

OSNEY LOCK HYDRO

A step up

- **Pool and weir** fish passes work like a **stairway** of water
- Water flows over barriers or **weirs** creating the **pools**
  - This **slows the water** down, which helps fish to **swim up** the slope
  - To **migrate upstream**, the fish need to jump from one pool to another
  - What **type** of fish do you think a **pool and weir pass** would be suited to and why?

OSNEY LOCK HYDRO

Pool to pool

- In **vertical slot ladders**, walls are used instead of **weirs**
- The **vertical slots** are gaps in the walls that allow the fish to swim **upstream** from pool to pool
  - This type of pass is suited to places where a **large number** of different fish species are migrating
  - How do you think this particular **design** might make the fishes' passage **easier**?

OSNEY LOCK HYDRO

Slow the flow

- Other types of **fish pass** use **rocks** or **baffles** to **slow the flow** of water down a slope
  - **Rock ramp** passes work in a very similar way to **pool and weir passes**
  - However, plastic or metal **baffles** (right) allow a constant flow of water
  - What type of **situation** might be suited to a baffle fish pass?

OSNEY LOCK HYDRO

Task 2: Something fishy

OSNEY LOCK HYDRO

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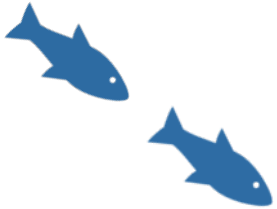

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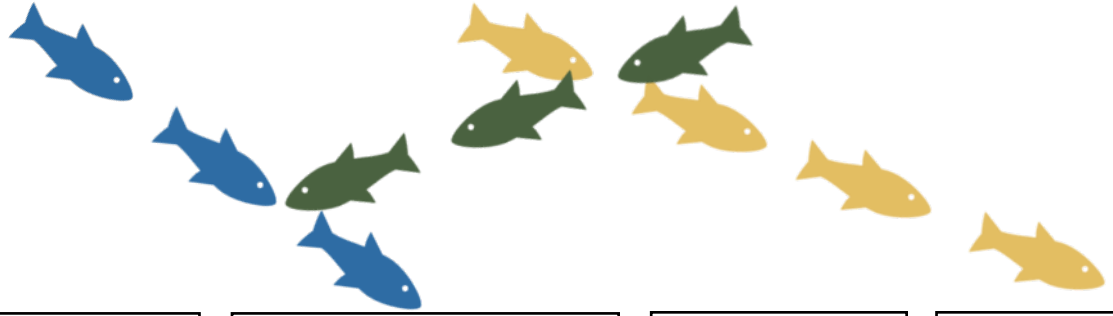

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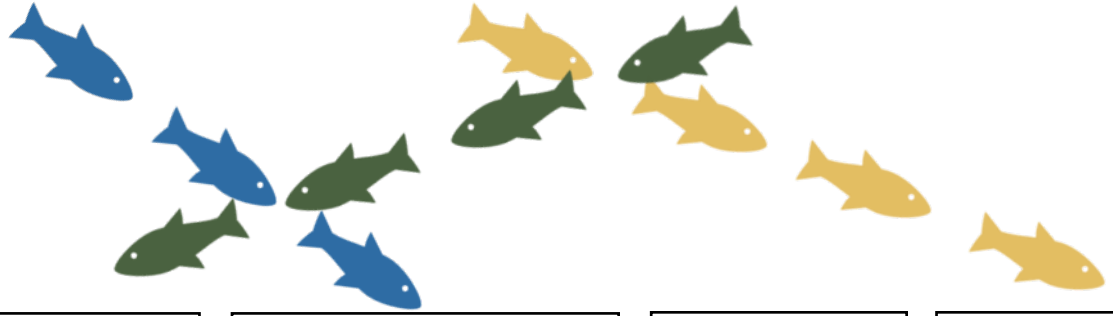

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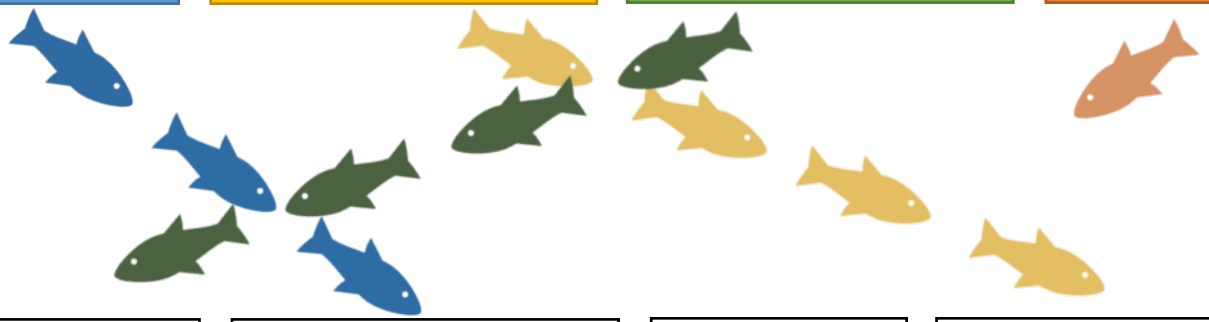

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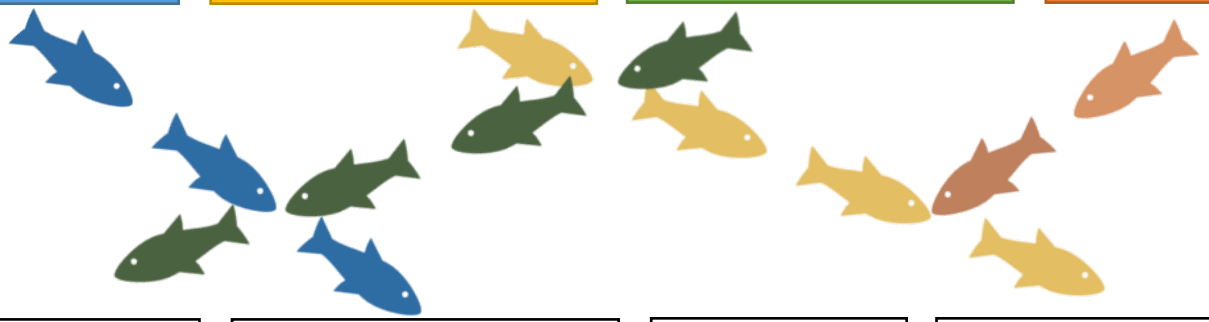
A wide river weir used by a **large number** of **different species** of fish	A Scottish river where **salmon** need to access their **spawning territories**	A **fast moving** Thames **weir** with a **2 metre** height change and limited space	A large, **high** dam on a river that is home to **many migrating fish**



Baffle pass	**Vertical slot pass**	**Fish lift**	**Pool and weir pass**
			

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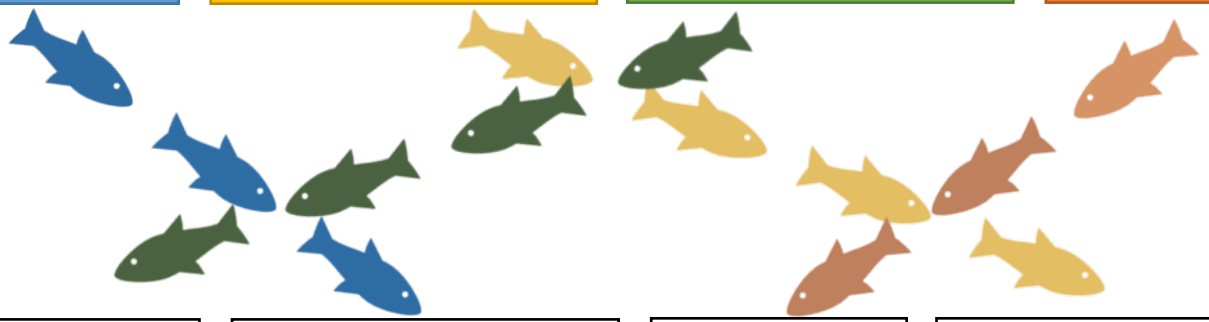

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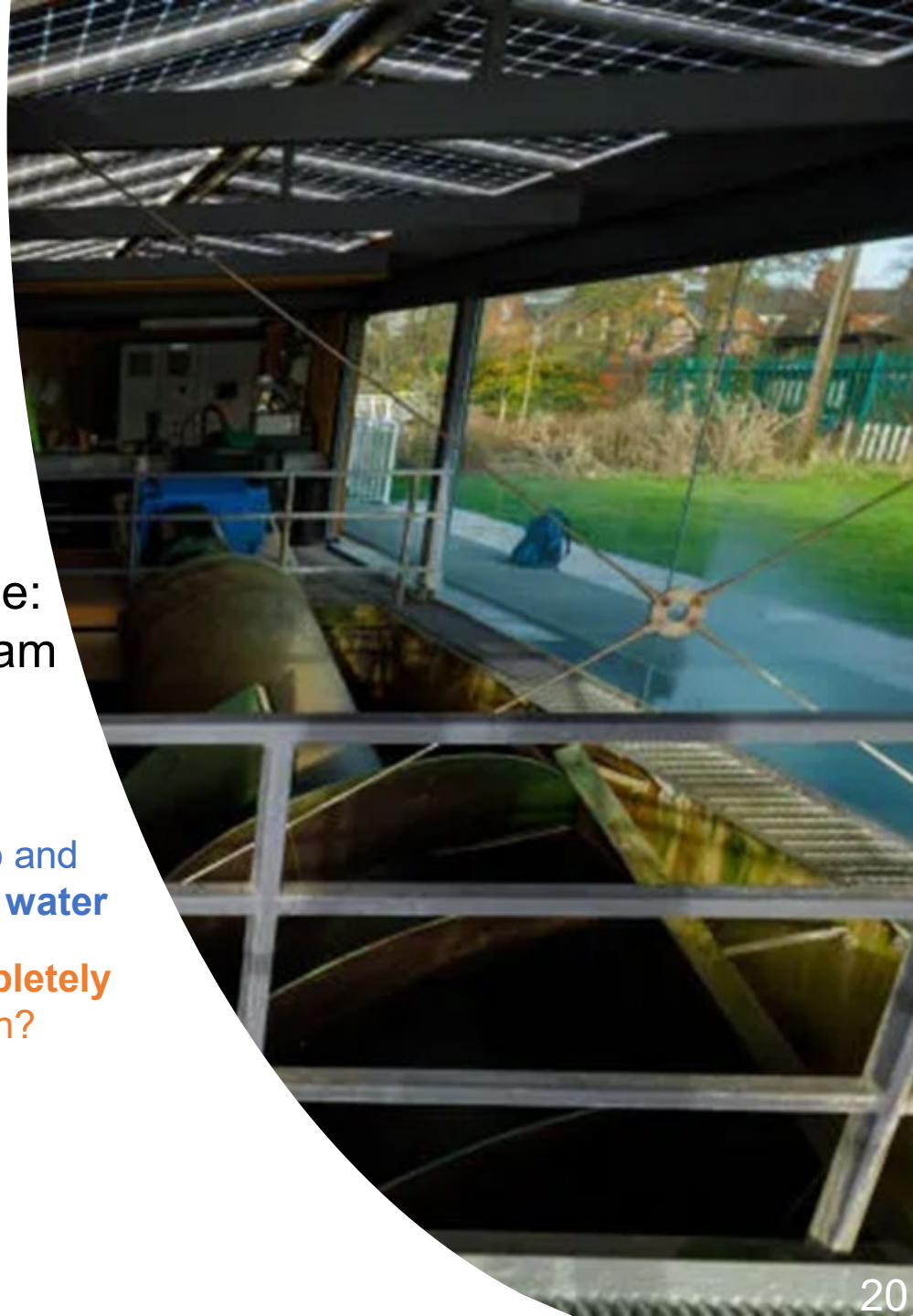
Fish at Osney Lock Hydro

- The screw turbine at **OLH** is **better** than other types of turbine: allowing fish passage downstream
  - The **reverse** Archimedes screw **rotates slowly** and consistently
  - Fish can **enter** the screw at the **top** and move **down** safely with the **flow of water**
  - Does the Archimedean screw **completely solve** the problems of migrating fish?



OSNEY LOCK HYDRO

The solution!

- Sadly, a screw turbine does not enable fish to swim **upstream**
  - At Osney Lock Hydro, there is a rise of **1.8m** so a **fish pass** was needed
  - **Brushes** were used to **slow down** the water and create a cascade of pools which help fish to **move up the slope**
  - At OLH the pass is around **27m long** and 1.6m wide. Why does it need to be so long?

OSNEY LOCK HYDRO

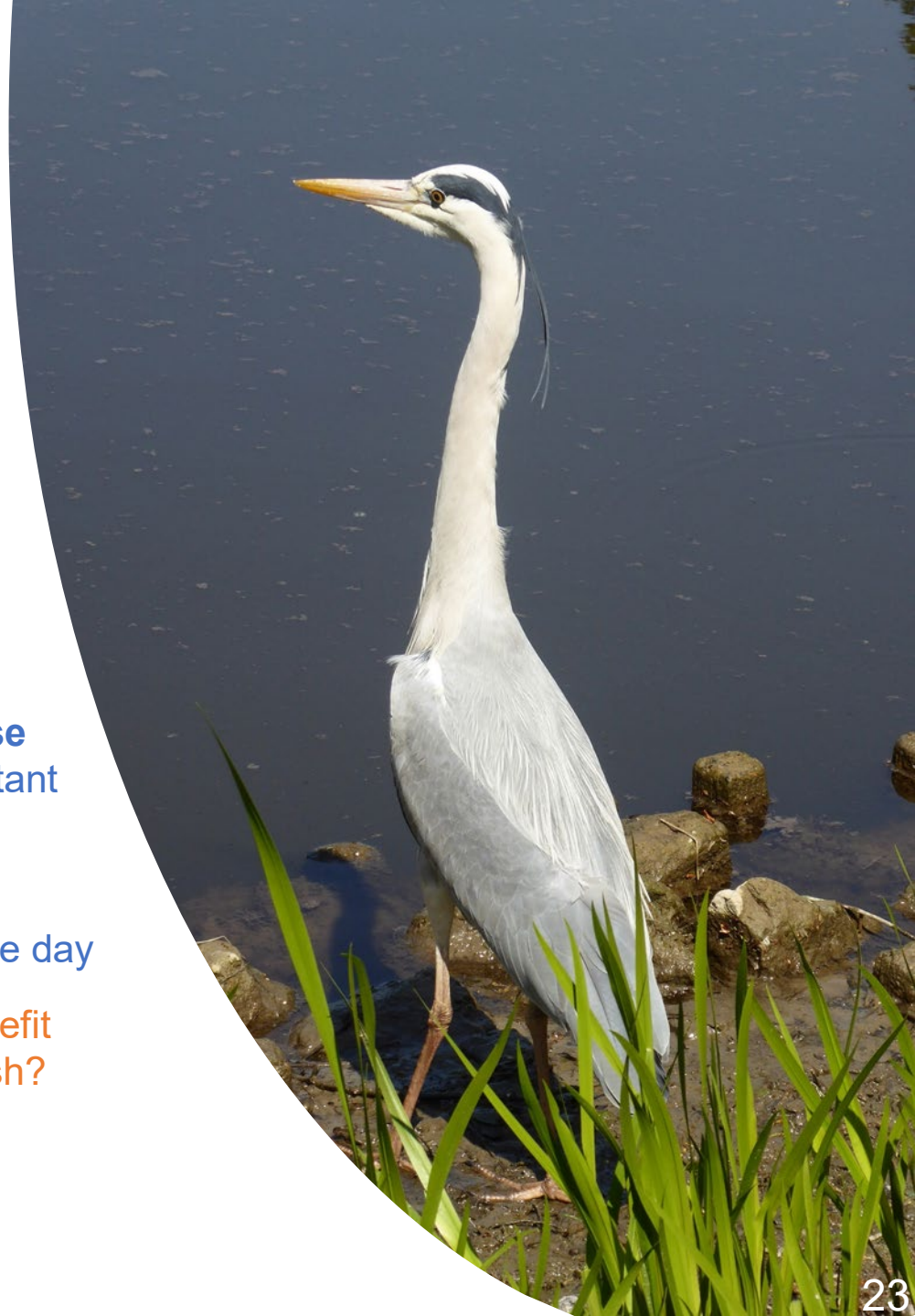
A new era

- Osney Lock Hydro fish pass uses a series of **polypropylene** strips to construct the **brushes**
  - The brushes are **flexible** and **move** in a similar way to **reeds** in the current
  - Fish are now able to **move freely upstream** at **Osney lock** for the first time in **200 years**!
  - What difference do you think this could make to the **river ecosystem** at Osney?

OSNEY LOCK HYDRO

Hope for the future

- **Many species** present in the river at Osney now benefit from **increased mobility**
  - The fish pass should help to **reverse population decline** in some important species including **eels** and **trout**
  - There is even the potential to see **salmon** arriving via the Thames one day
  - What other types of wildlife will benefit from the increased movement of fish?



OSNEY LOCK HYDRO

Unlocking the Thames

- The fish pass at **Osney** is just one of **many being built** along the length of the Thames
  - Downstream, **Sandford Hydro** is the largest **community-owned hydro** on the **River Thames**
  - At Sandford, they built a fish pass to encourage all kinds of fish to **migrate upstream** beyond the Lasher Weir
  - Looking at the image on the right, what **type of fish pass** is the Sandford fish pass?

OSNEY LOCK HYDRO

Task 3: Freedom of movement

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Illustrate how a fish pass helps fish move upstream

Show how fish and other species benefit from the installation of a fish pass

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OSNEY LOCK HYDRO

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- Can you name **two types** of fish pass/ladder?
- What have been used in the fish pass at **OLH** that **move** in a similar way to reeds and **slow the stream**?

OSNEY LOCK HYDRO

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