

Kompensaatiopeli

Biodiversity Offsetting Game Rules

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Game Overview

This area is inhabited by numerous enchanting species – a magical diversity of birds and mammals, insects and invertebrates, fish and flowers. Each of these species is under threat – their disappearance would result in the regional extinction of these species. The local people are aware of this, and they are worried about the future. Will their grandchildren have the opportunity to smell the sweet butterfly-orchid, see the beauty of the false heath fritillary, hear the funny call of the little bustard and witness the flight of the Siberian flying squirrel?

The area is also undergoing societal and economic changes. Near the rich and beautiful forests, swamps, meadows and water bodies, large parts of the area have already been put to urban and industrial use. Politicians, entrepreneurs and local inhabitants are pressured to develop the infrastructure and create more jobs. People need more energy, more efficient modes of transportation, more natural resources, and new housing.

New development projects require land and resources, jeopardizing the wellbeing and existence of animals, plants and other beings already inhabiting those areas. How can all these needs be met? Is there a way to utilize the land without damaging the ecosystem?

Biodiversity offsetting is a method used to compensate for environmental losses. New, alternative habitats are created for species that are threatened by human development. The developers may work together with a local environmental organization and engage in offsetting or in some cases they might be able to buy units from a biodiversity offsetting bank that restores habitats. Ideally, offsetting guarantees that the changes in biodiversity are fully compensated for.

Biodiversity offsetting is an appealing idea. However, the results of offsetting are typically uncertain, and there are many interest groups that may oppose offsetting. On top of this, offsetting legislation can be flexible or strict, and subject to change.

If you were a developer interested in making big money, how would you proceed with your investment projects in this area? Or if you were a whole-hearted environmentalist, how would you react to offsetting procedures as a means of compensating biodiversity losses?

It's time to find out and play the Kompensaatiopeli!

The game simulates the mechanics of biodiversity offsetting and the controversies surrounding its implementation as a tool for nature conservation and land-use planning. Biodiversity offsetting is a fairly new tool when it comes to conservation and land-use planning. **Biodiversity offsetting** means that the damages that eg. project construction causes to nature are offset by restoring similar nature elsewhere.

The game is designed for 4 or 6 players (or player pairs or groups).

The game duration is ca. 75-120 minutes (5 or 7 rounds).

The game is intended for players age 12 and up.

The Goal of the Game

In Kompensaatiopeli two teams of players, **conservationists** and **developers** compete against each other. The game is played on a game board, or play area, consisting of 25 nature tiles set in a 5x5 square. The goal of the game depends on which faction the player belongs to: **developers** aim to replace nature tiles with project tokens, while **conservationists** aim to keep as many nature tiles on the table as possible.

The game is played over a series of rounds, divided into player turns. During each player's turn, the player can use their hand cards to conduct various actions, depending on their role. Players score points for their team based on the actions they do during the game. Developers gain points from placing project tiles onto the game board, and conservationists gain points from placing, e.g. offsetting, nature conservation area and protest campaign tokens onto the game tiles. At the end of the game, the team with more points wins the game.

1. Game Components

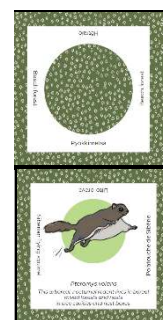
List of components

56 Nature tiles

Large tiles with a green Kompensaatiopeli logo background.



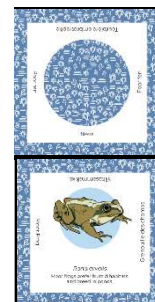
9 empty **forest** tiles and 9 **protected forest species** tiles: five with a single circle, two with a double circle and one with a red triangle background.



8 empty **meadow** tiles and 8 **protected meadow species** tiles: six with a single circle, one with a double circle and one with a red triangle background.



8 empty water and aquatic environments tiles and 8 protected water species tiles: seven with a single circle and one with a double circle.

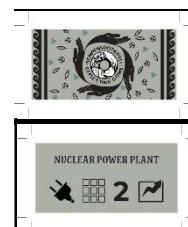


5 polluted land tiles.



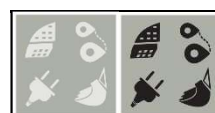
15 Project header tiles

- 7 sustainable project tiles
- 6 profitable project tiles
- 2 non determined project tiles
- Including: 4 real-estate project tiles, 4 energy project tiles, 4 material project tiles, 4 mobility project tiles



44 Tokens

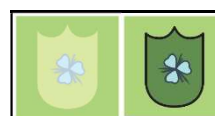
20 double-sided project tokens



6 double-sided offsetting site tokens



6 double-sided conservation area tokens



6 media campaign (yellow) / protest camp (orange) tokens



6 restored nature (brown) / declined landowner (red) tokens



9 Role cards

Open beta release: Nygren, Brunet & Kankainen (2019) Kompensaatiopeli. A game for discovering the implementation of biodiversity offsetting and its controversies. Version 04/2020
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3 conservationists and 6 developers



100 Hand cards:
 with a brown back side



50 Resource cards



10 Dirty money cards



22 Knowledge cards:

6 forest knowledge



6 meadow knowledge



6 water and aquatic knowledge



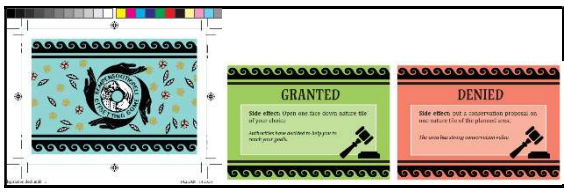
4 holistic knowledge



18 action cards



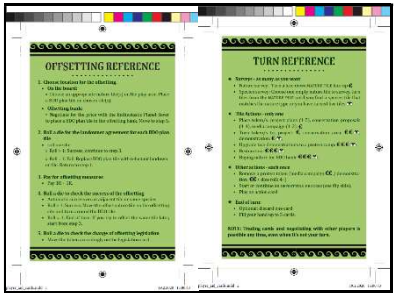
17 permit cards with two "suits" and blue back side.



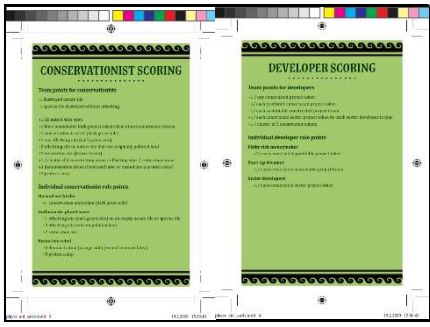
1 Offsetting legislation card



12 (two sided) reference cards
 6 turn / offsetting reference cards



6 scoring reference cards



2. Game Setup

Create the play area

Shuffle all the nature tiles together and set 25 of them face down into a 5x5 square to form the play area. Set the rest of the tiles aside as a draw pile. Starting from any corner of the play area, turn **every other tile** on the outer rows of the square face-up, so that there are eight face-up tiles (see the picture below).

There are **two types of nature tiles** - tiles with a species on them and tiles without any species. The tiles with species indicate protected species. These are valuable for conservationists since conservation areas can only be proposed and constructed on species tiles. They also matter for developers, since the coloured shape behind the species image indicates how difficult it is to offset the species. (one green circle = easy, two circles = difficult, red triangle = not possible). [IMAGES, NOT WORDS] (see offsetting rules later)

To regulate the game balance, follow these rules for the tile setup:

- Among the **open (face up)** nature tiles, there should be one empty nature tile (without species) and the rest (7 tiles) should all be species tiles. If there are too many empty tiles, draw tiles from the nature tile draw pile until you find enough species tiles to replace the empty ones. These can be of different nature type (forest, meadow, water and wetland) than the original one. Put the exchanged empty nature tiles back in the nature tile deck.
- If all opened tiles have species in them, replace the one opened last with an empty nature tile as described above.

Put the remaining nature tiles next to the play area as a draw pile.

Mine set up (optional): *If the players feel that it is too unrealistic to be able to create mining-related projects anywhere on the board (since ore deposits are found only in specific places), they can choose three middle (adjacent) tiles on the edge of their choice to indicate the ore deposit. In this case, mine projects can only be placed there. Place three tokens (for example pebbles) on these three nature tiles. This has no other effect than restricting the place where mine projects can be planned and constructed - all other game actions are possible on these ore tokens.*

Prepare decks, piles and trackers

Decks

- **Funding deck.** Take 25 resource cards and 8 dirty money cards and shuffle them into a **funding deck**. Place it next to the play area so that the developer players can easily reach it.
- **Main deck.** Shuffle the rest of the cards (resource cards, 2 dirty money cards, action cards and knowledge cards) as the **main deck**. Place 3 cards from the top of the deck face up next to the deck (see picture). Place the deck within reach of all players.
- **Project headers and tokens.** Put the **project headers** and **project tokens** within reach of all developers. Count 5 project tokens per developer in the game.
- **Permit deck.** Shuffle all of the permit cards together and place this **permit deck** next to the play area within reach of all players.

Offsetting legislation card. Place the purple offsetting legislation card next to the play area, so that it is visible to all players. Put a marker on the middle box with numbers 3-4.

Score and round tracker. Place the score and round tracker next to the play area. On the score tracker, put a developer token on 0 and a conservationist token on 10. Put the round tracker token on one and move it forward by one step when at the beginning of each round.

[IMAGE: play_area_setup]



Image 1: Play-area set-up.[we will get new images]

Setup:

1. Score tracker with markers on starting positions
2. Main deck, with 3 cards face up next to it
3. Nature tile deck
4. The play area / game board
5. Project header deck
6. Legislation card
7. Mine setup (optional)

Choose roles

Each player chooses a role to play in the game. Roles are divided into two teams, **developers** and **conservationists**.

Developers aim to construct as many projects as they can by placing tokens on the nature tiles. However, they have to offset protected species on the nature tiles they are constructing on.

There are six different developer roles in the game. Each developer player aims to build their own types of projects - sustainable, profitable or a specific sector (real estate, material, energy and

mobility). The different developer roles in the game are: **Filthy Rich Money Maker** (profitable), **Start-up Dreamer** (sustainable), **Real-Estate Millionaire** (real estate), **Mobile Opportunist** (mobility), **Cynical Materialist** (materials) and **Energetic Futurist** (energy).

Conservationists aim to conserve as many nature tiles as they can. This means that they have to try to slow down construction projects in different ways depending on their role. There are three different conservationist roles in the game: **Burned-out Birder**, **Enthusiastic Planet-Saver** and **Extinction Rebel**. All conservationists aim to save as much nature as possible, but they have different strategies to achieve this. These strategies are represented by different actions available for each conservationist.

When playing with four players, deal out these roles:

- Burned-out birder
- Enthusiastic planet-saver
- Filthy rich moneymaker
- Start-up dreamer

If there are six players, add these roles:

- Extinction rebel, and
- Any one sector developer (Real-Estate Millionaire [real estate], Mobile Opportunist [mobility], Cynical Materialist [materials], Energetic Futurist [energy])

Roles can be dealt randomly, or the players can choose their roles.

[TEXT BOX]

We feel that it is good to choose a role that differs from the player's own stance on the issue. This allows the player to experience the subject from a different perspective than normally, and hopefully inspires more discussion and reflection on the positions, interests and interaction of various stakeholders.

[/TEXT BOX]

After the roles have been chosen, each player gets a set of tokens (corresponding to their role) as listed in the table below.

Role	Tokens AND IMAGES
Burned-out Birder	Conservation tokens. (If there are four players (=two conservationists) in the game the burned-out birder gets also protest tokens.)
Enthusiastic Planet Saver	<ul style="list-style-type: none"> • Offsetting site tokens. • Restoration / landowner tokens.
Extinction Rebel	Protest tokens.
Developers	Developers will use the project headers and project tokens on the table (count 5 per each developer role in the game).

Role	Goal
------	------

Developers	
Filthy rich money maker	Constructing profitable projects.
Start-up dreamer	Constructing sustainable projects.
Mobile opportunist	Constructing mobility projects.
Cynical materialist	Constructing material projects.
Energetic Futurist	Constructing energy projects.
Real estate millionaire	Constructing real estate projects.
Conservationists	
Burned-out Birder	Protecting nature from development and setting up conservation areas.
Extinction Rebel	Protecting nature from capitalism and setting up media campaigns/demonstrations/a protest camp.
Enthusiastic Planet Saver	Reconciling nature conservation and economic development. Conducting ecological restoration and offsetting.

Deal cards

- Deal 4 cards out of the funding deck and 1 card from main deck to each developer player.
- Deal 5 cards out of the main deck to each conservationist player.

Note: During the game each player has a maximum hand limit of 7 cards.

Filthy Rich Money maker opens the game. The turn order proceeds clockwise. After each round, move the round counter forward by one. The game ends after 5 rounds (6 players) or 7 rounds (4 players).

Add points to the score tracker whenever a player gains points during their turn (see below for the detailed scoring system).

1. Playing the Game - Quick guide

Developer quick guide

Developers aim to build projects that consist of the project header and adjacent project tokens. The developers get points whenever they replace a **nature tile** with a constructed **project token**. The project tokens have two sides: one for project plan and one for constructed project. Before constructing a project, the developer needs to plan the whole project by choosing a project header and placing the project tokens on the gameboard (nature tiles) by using as many project tokens as indicated on the project header. The plan must start from one of the open nature tiles on the edge

of the tiles on the table, and additional tokens must be placed on adjacent tiles in the shape indicated on the project header (see picture). Plans need to successfully pass the permit process (see page XX) ! Constructing project tokens (turning them) on another turn might require offsetting the loss of nature tiles.



[IMAGE: project_plan]

[TEXT BOX]

List of player actions:

- **Surveys - as many as you want**
 - Nature survey: turn a face down nature tile face up (1€)
 - Species survey: Choose one empty nature tile to survey. Reveal **up to five** tiles from the top of the nature draw pile to find a species tile that matches the nature type of the chosen tile. If you find a matching species tile, replace the nature tile with it. Shuffle the rest of the tiles back into the draw pile (1K)

- **Tile actions - only one per turn**
 - Place token/s: project plans (1-5) (1€)
 - Turn token/s: Project construction (1€)

- **Other actions - each can be done once per turn**
 - remove a protest token (media campaign 2€ / demonstration 2€ + dice 4-6)
 - start or continue an offsetting process
 - play an action card

- **End of turn**
 - Optional: discard one card
 - Fill your hand up to 5 cards

Note:

Trading cards and negotiating with other players can be done at any time, even when it's not your turn.

The maximum hand limit of 7 can't be exceeded even by trading.

[/TEXT BOX]

Conservationist quick guide

Each conservationist can use unique character specific actions based on their role. These actions help them conserve nature and block developers from constructing projects.

Conservationists score points from their character specific actions:

- Burned-out Birder can propose and establish nature conservation areas
- Enthusiastic Planet-saver can restore polluted areas, conduct offsetting and establish an offsetting bank
- Extinction Rebel can do protest actions (media campaigns, demonstrations and a protest camp).

All conservationists can also do nature surveys (reveal nature tiles), and species surveys (search the nature draw pile for **species tiles**) to find protected species on empty nature tiles. By doing this, the conservationists can replace empty nature tiles with species tiles on the game board, which makes it harder for the developers to construct projects on those tiles.

[TEXT BOX]

List of conservationist player actions:

- **Surveys - as many as you want**
 - Nature survey: turn a face down nature tile face up (1€)
 - Species survey: Choose one empty nature tile to survey. Reveal **up to five** tiles from the nature draw pile to find a species tile that matches the nature type of the chosen tile. If you find a matching species tile, replace the nature tile with it. Shuffle the rest of the tiles back into the draw pile (1K)
- **Tile actions - only one per turn**
 - Place token/s: conservation proposals (1-4, Burned out birder), media campaign (1-2 (extinction rebel). (1€)
 - Turn token/s: Conservation area (2€+K Burned out birder), demonstration (1€+K, extinction rebel), protest camp (3€+K, extinction rebel)
 - Restoration (3€+K, enthusiastic planet saver)
 - Buying a nature tile for BDO bank (3€+K enthusiastic planet saver)
- **Other actions – each can be done once per turn**
 - start or continue an offsetting process (enthusiastic planet saver)
 - play an action card
- **End of turn**
 - Optional: discard one card
 - Fill your hand up to 5 cards

Note:

Trading cards and negotiating with other players can be done at any time, even when it's not player's own turn.

The maximum hand limit of 7 can't be exceeded even by trading.

[/TEXT BOX]

3. Detailed rules

1. Surveys

Surveys are a way for the players to reveal new nature tiles on the board, and a way to potentially replace empty nature tiles with species tiles. There are two types of surveys: **nature survey** and **species survey**. Players can conduct as many surveys as they want during their turn as long as

they can afford them. The active player can conduct a survey at any time during their turn, even in the middle of another action.

[TEXT BOX: **Additional info box:**]

Nature surveys are a key part of obtaining information of the biodiversity of an area in nature conservation, land-use planning and offsetting. The surveys often concentrate on protected species due to practical reasons. Surveys are usually an obligatory part of land-use planning but conservationists often do their own surveys to have a stronger argument for conserving the area in question. Sometimes surveyors don't succeed at finding protected species, and in these cases, it is easier to justify construction on the site. In the game, if the player doesn't find a species tile corresponding to the nature type, it means the species survey was unsuccessful and a protected species was not found.

[TEXT BOX]

Nature survey

A player can conduct nature surveys to reveal the face down nature tiles on the game board. A nature survey costs one resource card and allows the player to choose one face down nature tile to turn face up.

Species survey

A species survey is done in order to find a species tile to replace an empty nature tile (a tile with no species). It can be done even if the nature tile has other tokens on top of it. However, species surveys cannot be done on polluted land tiles or on a species tile.

Species surveys costs one knowledge card [binoc_tiny] corresponding to the type of the chosen nature tile. Then the player reveals tiles from the top of the nature draw pile until they have **found a matching species tile or have revealed 5 tiles**. If the player finds a matching tile, it replaces the original nature tile. Then the rest of the tiles, including the replaced tile, are shuffled into the nature draw pile.

Example with an image: the burned-out birder uses a forest knowledge card to conduct a species survey on an empty forest tile. The third nature tile revealed from the nature draw pile is a flying squirrel. The flying squirrel species tile replaces the empty forest tile and the empty forest tile is shuffled in the nature pile with the other 2 revealed cards.

2. Tile actions

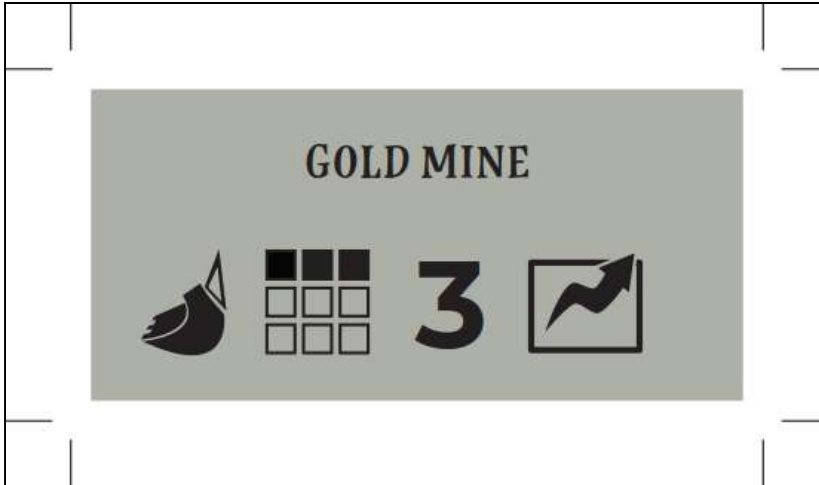
Planning a new project

Only developers can plan and construct projects.

Overview of the planning process (see details below):

1. Choose a project header from the project header pile
 2. Find an **eligible place** for the project plan. Conduct **nature surveys** if there are not enough face-up tiles in a good place.
 3. Pay the planning cost (1€)
 4. Place the header and tokens on the eligible place
 5. Permit process
1. Choose a project header

As a developer player you start by selecting a project header tile. You can choose any project header you want from the available project header pile. There are several icons in each of the project headers which affect where you can build the project, and how many points does the player and the team get for each built project token “under” the header.



Project header symbols:

Each matching symbol gives +1 points for each constructed token IF the developer role with this symbol is in play

Table with symbol images:

Sustainable - start-up dreamer

Profitable - filthy rich money-maker

Real estate - Real-Estate Millionaire

Mobility - Mobile Opportunist

Materials - Cynical Materialist

Energy - Energetic Futurist.

See the **Calculating the Score** section on page xx for more information on points.

Shape symbol (IMAGE) indicates the shape of the project and shows where the project can be placed on the game board. The tokens must be placed adjacent to each other and one of them must touch the project header.

[IMAGE: project_symbol_examples]

[TABLE]

Empty grid [IMAGE: empty_grid_symbol] = free placement

Horizontal black squares [IMAGE: horizontal_squares_symbol] | **place tokens only in the middle edge tiles.** (See image)

Vertical black squares on the edge [IMAGE: vertical_edge_squares_symbol] = place tokens only on tiles on the edge in a straight line (See image)

Vertical black squares in the middle [IMAGE: vertical_middle_squares_symbol] = place tokens only in a straight line, only first (and last) can be on the edge tiles (See image)

Water symbol [IMAGE: project_water_symbol] = Must start from a water habitat tile.

Size number [IMAGE: project_size_symbol] indicates the size of the project. The size of the project refers to the amount of project tokens (1-5) you need in planning the project. Note that the size of the project does not affect the planning cost (1€) of the project.

[/TABLE]

2. Eligible place

Place the project header next to the game board, to indicate where you want to plan the project. Then place the tokens planning side up onto the nature tiles, starting with the one next to the project header. All the nature tiles must be eligible for a project before you place the tokens on them.

[IMAGE: eligible_example_1]



A nature tile is eligible for a project if it is face up and there are no tokens on it, with the exception of the **conservation proposal** -token. In order to plan a project, the player has to make sure that all the nature tiles covered by the project are eligible before tokens are placed on them.

The player can conduct **nature surveys** to turn nature tiles face up even in the middle of this action.

Once the player has identified an eligible place for the project, they pay the planning cost 1€ and place the project header and the indicated number of project tokens on the eligible place on the game board, in the shape and size indicated on the project header. The project header is placed outside of the nature tiles and the first project plan token is placed adjacent to it on top of the nature tile.

[IMAGE: eligible_example_2]

Permit process

The permit process is an obligatory part of planning a project. The developer player who is planning the project must go through the permit process, **but** the conservationist players can also

partake in it. Some action cards can be used during the permit process (see info box on Action Cards).

The permit process consists of **three phases**:

1. **Initial permit decision.** The developer player planning the new project reveals the top card of the permit deck.
2. **Appeal to court.**
 - o the conservationists decide first if they want to try to appeal the initial permit decision. If conservationists do not contest the initial decision, the developer player planning the project can also try to appeal the decision.
 - o Appealing costs 1€ OR a suitable action card with *[IMAGE: hand_tiny]* symbol
 - o Appealing is done by revealing the next card from the permit deck (unless the action card used states otherwise).
3. **Final court decision.** The developer **or** conservationist players who did **not** take part in the appeal phase can affect the final court decision in this phase. The process and the cost are the same as in the previous phase.

The permit process does not have to go through all these phases - it can stop in any of the phases mentioned above. When the permit process has concluded, the topmost open permit card becomes the final permit decision, and **only this card's effect will be resolved.**

The effects of the permit cards are divided into **permit granted** and **permit denied** cards. Some of the permit granted cards have additional conditions. These are known as **conditional permit cards**. If the conditions cannot be met immediately on the same turn as the card was revealed, the permit is denied. Some of the permit cards have additional **side effects** which take place immediately when the card is resolved.

[IMAGE: permit_process_example]

Revealed permit cards are left open in a pile next to the permit deck. If there are not enough cards in the deck to draw, the used cards are reshuffled into a new permit deck.

[TEXT BOX]

Permit action cards. There are two permit action cards among the action cards in the main deck. These cards can be used in the permit process and they are marked with the *[IMAGE: club_tiny]* symbol. After a permit action card is played during the permit process it is placed into the main discard pile.

EU Court Decision

This action card allows the player to draw two cards from the permit deck and place them in any order on top of the open permit pile. The "Cooperation with the authorities" permit action card allows the player to decide the permit process outcome (permit granted or denied) without drawing further cards. The permit process ends there. The card can be played at any of the three phases of the permit process..

- Note! The action card "political influence" is **not** a permit action card to be played during the permit process. This action card **modifies the permit deck before the permit process.** By playing this card during their turn, the player can select 3 cards to be removed from the permit deck and put them aside temporarily. The removed cards are shuffled back into the permit deck after the next permit process.

[TEXT BOX]

If a permit is granted to the project, the project planning process finishes, the project tokens stay on the gameboard and any conservation proposal tokens on the same tiles are removed. If permit is denied from the project, remove the project header and project tokens and put them back with the others, and continue the turn as normal.

Constructing a project token

Construction process overview:

1. Choose a **project token**.
2. Check for protest tokens
3. Check offsetting requirements
4. Conduct offsetting if needed (see Offsetting rules)
5. Pay for construction (1€) and turn the project token around

Choose a *project token*

A project that has passed the planning process (see chapter above) can have its **project tokens constructed**. However, project tokens cannot be constructed on the same turn that the project was planned. The player can construct **only one** project token per turn, starting from the unconstructed token closest to the project header. The player can construct a token from any project they want, developers don't have their "own" projects.

Check for protest tokens

If there is a **protest token** (media campaign or a demonstration) on the same tile as the project token you are trying to construct, the protest token needs to be removed first. Removing a media campaign costs 2€. Removing a demonstration costs 2€ and a dice roll must be passed: On a roll of 4-6, the demonstration is removed. If the dice roll is 1-3 the demonstration stays and construction of that tile can't proceed. If there is a protest camp (a protest token with its demonstration side up on top of the project header), the whole project is blocked and can't be constructed. A protest camp cannot be removed.

Check offsetting requirements

During the game, there are nature tile constraints and conditions that affect the construction of projects. These limitations depend on the type of nature tile the project is planned on and the current status of the offsetting legislation (see offsetting legislation card below):

If the project plan token is on an **empty nature tile (or no nature tile at all)** and if the current status of offsetting legislation does not require offsetting of empty nature tiles, the construction can happen without delays or additional costs. **A polluted land tile** will never require offsetting. If the project plan token is on a **species tile**, the species might need to be offset (if however, offsetting legislation is set to voluntary offsetting, offsetting is not obligatory). **See offsetting rules!** If offsetting is not required or it has already been done, the construction can proceed.

[TEXT BOX: action cards]

There are two action cards especially useful in project construction. Both "**Oops**" and "**Derogation**" action cards destroy one nature tile under a project plan token chosen by the player. The destroyed species tile is placed aside, conservationists lose one point, and the tile is not shuffled back into the nature draw pile to indicate **net loss of biodiversity**.

[TEXT BOX]

If construction is possible and all conditions have been met, the project token can be constructed. Construction costs 1€. When a token is constructed it is turned dark side up. If there was a nature tile under it, the tile is removed and shuffled back into the nature draw pile. If a species tile is removed without offsetting (some action cards and voluntary offsetting legislation setting allow this), the species tile is not shuffled back to the nature pile and is instead placed aside to signify net loss of biodiversity.

If construction was done on a species tile while the legislation was set to voluntary offsetting, roll the die to check if the legislation changes after the construction is finished.

Offsetting rules

Quick overview of offsetting process:

1. Check the offsetting mode: the current number on the offsetting legislation card, and the nature tile under the project token
2. Choose a location for the offsetting site
3. Pay for the offsetting measures
4. Roll the die to check the success of the offsetting measures
5. Roll the die for legislation change

Offsetting can be conducted only by **developers** and **the enthusiastic planet saver**. Nature tiles with completed offsetting sites (offsetting site tokens with their dark side up) on them cannot be used for anything else (other tokens cannot be placed on these tiles). Offsetting site tokens cannot be removed except with the **corruption** action card.

Offsetting legislation

Legislation card

Offsetting is conducted according to the value marked on the offsetting legislation card. At the start of the game a token is placed on **Baseline**, marked with 3-4. After each completed offsetting process, the legislation can change according to the dice roll.

[TABLE]:

Offsetting legislation modes:

- 1. Voluntary offsetting:** offsetting can be done but it is not obligatory (not even for species tiles). Construction is possible even on tiles with unoffsettable species.
- 2. Flexible offsetting:** a species tile can be offset by any kind of nature tile (does not have to be the same nature type). The ratio is normal.
- 3 - 4. Baseline:** Offsetting of the species tiles is obligatory, a species must be offset with the same type of nature tile, and the ratio is the same as indicated on the species tile (number of coloured circles).
- 5. Ratio +1:** Offsetting is obligatory, but the offsetting ratio is increased by one. This means that species with the normal ratio of 1, need to be offset by two tiles of the same nature type, and species with the normal ratio of 2, need to be offset by three tiles of the same nature type.
- 6. Offset everything:** Not only species, but also empty nature tiles must be offset with tiles of the same nature type. The offsetting ratio is normal.

[/TABLE]

Nature tiles

Check the nature tile under the project token that you are going to construct: is offsetting voluntary or obligatory for this nature tile? What is the offsetting ratio for this tile?

[TEXT BOX / table: information]

Offsetting ratio BOX

The coloured symbol behind the image of the species indicates the default offsetting ratio of the tile. During the game the offsetting ratio might get modified by the value of the offsetting legislation card.

[IMAGE: *offsetting_ratio_in_nature_tiles*]

- One green circle means that the species has a default offsetting ratio of 1 - one species tile needs to be offset with one nature tile
- Two green circles mean that the species has a default ratio of 2, meaning that to offset one species tile, two nature tiles need to be used for offsetting.
- If there is a red triangle, the species is so rare that it cannot be offset and constructing is not possible (unless offsetting is voluntary on the legislation card or the tile is removed by an action card)

[/TEXT BOX]

Location for offsetting site

On the board: choose an open nature tile (or several, if the offsetting ratio is more than 1). The nature type of the selected tile should correspond to the type of the tile which will be removed when the project is constructed (unless the legislation card is set to flexible offsetting).

Ex. If the player is going to destroy a flying squirrel species tile (forest, ratio 1:1), select another face-up forest tile for offsetting.

The selected tile cannot have tokens on it (except offsetting *plan* or *conservation proposal* tokens). The selected tile can be either an empty nature tile or it can be a species tile. A tile cannot be used for offsetting more than once.

Offsetting bank alternative: If the Enthusiastic Planet Saver has already set up an offsetting bank and the bank has enough unused nature tiles of the required nature type, the developer player can negotiate with this player to buy an offsetting project from their bank. The price can be negotiated freely between the developer and the enthusiastic planet saver. **If the offsetting bank is used, the process is shorter and less risky - the player pays to the Enthusiastic planet saver and continues to step 5 (Rolling for legislation change).**

[TEXT BOX]

Special cases when choosing the tile/s for offsetting:

- **Polluted land:** Offsetting can be done on a polluted land tile. In this case it happens through a similar process as restoration, but a restoration token is not used. Restoring polluted land into other nature tile costs 3€ + K. The type of the knowledge used dictates what kind of nature is restored onto the polluted land tile. The player reveals tiles from the top of the nature draw pile until they find a tile (it can even be a species tile) that matches the knowledge card's nature type (In the case of holistic knowledge,

the nature type can be freely chosen). The first matching nature tile replaces the polluted land tile and the offsetting process continues as normal. Note that previously restored land with a restoration token on it cannot be used for offsetting. The replaced polluted land tile is removed from the game.

- **Bigger/higher ratio:** If the resulting offsetting ratio is more than one to one (depending on the species tile and the offsetting legislation card), the player must select more than one matching nature tile for offsetting. All the chosen tiles must be **either** on the game board **or** from the offsetting bank, but not on both. When offsetting onto multiple tiles, only the cost of 1€ is multiplied, but not the cost of knowledge cards. Success dice is rolled only once for all tiles.
- **Flexible offsetting:** If the offsetting legislation set on “flexible”, the player can select any type of nature tile for offsetting.

[/TEXT BOX]

Payment for the offsetting measures

The cost of offsetting is 1€ + 1K. The knowledge card must correspond to the type of the nature tile that was used as an offsetting site.

Special situation: if the offsetting ratio is more than one to one, pay +1€ for each. The cost of K is not multiplied.

Checking the success of the offsetting measures

Roll the dice to check if the offsetting was successful.

[table]

On a roll of 2-6: Success. Move the nature tile under the project plan on top of the nature tile of the offsetting site, under the offsetting token. Turn the offsetting token around (dark side up) to signify a finished offsetting site.

On a roll of 1: Failure. Return to step 2 or discontinue offsetting.

Special situations with guaranteed success, no dice roll is needed:

- The offsetting site and the tile being offset have the same species. (In the case of ratio of more than one, one tile with the same species is enough to fulfil this condition)
- The offsetting site is on an adjacent tile (even diagonal). (In the case of ratio of more than one, one tile with the same species is enough to fulfil this condition)

[/table]

Rolling the die for legislation change

Roll the die for the offsetting legislation card to see if the legislation changes. The die result corresponds to the values of each square on the legislation card. Move the token on the card accordingly.

[TEXT BOX]

Special cases:

- In the case of voluntary offsetting, roll a dice to check for legislation change after any construction on a species tile, or after voluntary offsetting.
-

[/TEXT BOX]

[TEXT BOX: Action cards]

List of action cards that can be used only after an offsetting has been conducted at least once:

“Offsetting check-up” card: Choose an offsetting site. Roll a dice to check whether the offsetting has been successful or not. If the result is 1-3, the offsetting on that site was successful and no further action is required. If the result is 4-6 the Offsetting needs to be repaid (1R+1K) by player(s) involved. If they cannot do this, they must discard all their hand cards. This action card does not affect the offsetting token or nature tile in question, or players’ points, regardless of the result of the dice roll.

The **“Change of legislation”** action card can be played only after at least one successful offsetting has happened during the game. With this action card the player rolls a die and changes the legislation based on the result.

[/TEXT BOX]

Conservationist actions

Conservationist Actions	
Role	Actions
Burned-out Birder	Establish conservation areas
Enthusiastic Planet Saver	Restore polluted land, manage offsetting and establish an offsetting bank
Extinction Rebel	Set up media campaigns, demonstrations and a protest camp



Conservation actions: proposals and areas

Conservation actions are special actions done by the **burned-out birder**. These actions are used to **create conservation proposals** and to **turn them into conservation areas**. Conservation actions are advanced in the same kind of two-stage manner as other tile actions.

[IMAGE: conservation_area_example]



In order to establish a conservation area, a **conservation proposal** is needed. Conservation proposals can only be made on **face up species tiles** (see picture). A proposal costs 1€ and allows the player to place up to 4 conservation proposal tokens (light green side up) on the chosen species tiles. Unlike other tokens, conservation proposals do not block other actions on that same tile.

[TEXT BOX]

In real life conservationists do not have formal means to establish nature conservation areas themselves, but they usually propose and lobby the establishment of conservation areas on valuable areas with protected species for decision-makers.

[TEXT BOX]

During each turn, a single conservation proposal that was made during a previous turn can be turned into **conservation area** (darker green side), by paying 2€ + K. The knowledge card must match the nature type of the tile (or be holistic knowledge). Conservation areas are permanent and cannot be removed. Placing them in a cluster of at least three conservation, restoration or offsetting tokens gives the conservationists one extra point at the end of the game.

Restoration and offsetting bank

The enthusiastic planet-saver can restore polluted land tiles. Only the *polluted land* nature tiles can be restored. Restoration costs 3€ + K. The knowledge card type dictates what kind of nature tile replaces the polluted land tile. The player reveals tiles from the nature draw pile until they find a tile with the same nature type as the knowledge card used (all nature tiles are suitable when a holistic knowledge card is used). The first tile with a matching nature type (species or no species) replaces the polluted land tile and a restoration token is placed on top of it. No other actions can be done on restored nature tiles. Restoration tokens nor the nature tiles under them cannot be removed.

The enthusiastic planet saver can set up an offsetting bank. Buying one nature tile (one per turn) for the offsetting bank costs 3€ + 1 K. The type of the knowledge card dictates what kind of nature tile is bought for the offsetting bank from the nature draw pile. The player can choose any nature tile of that type from the nature draw pile (can be with or without a species). The offsetting bank tile is placed face up in front of the enthusiastic planet saver, separate from the playing area tiles. The offsetting bank can only have **up to two** nature tiles in total. From this bank, the planet-saver can sell offsetting projects (one per tile). The price can be negotiated freely between the developer and the planet saver. When offsetting is done onto one of the offsetting bank tiles, **do not roll a die** to check for success. The bank has already made the tiles suitable for offsetting, so all offsetting attempts will always succeed on them. The offsetting token (dark side up) is placed on the bank tile

after the project has been sold to a developer. Each bank tile can be used as an offsetting site only once.

Protest actions: media campaign, demonstration and protest camp

The protest actions are special actions done by **the extinction rebel** (when the role is not in play, they can be done by the burned-out birder). Protest actions are advanced in the same kind of two-stage manner as other tile actions. Protest tokens block developers from constructing planned projects on the tiles they are placed on.

A media campaign (yellow side) token can only be placed on a nature tile that has a project plan token on it (light grey side up). Once per turn, the extinction rebel may pay 1€ to place up to 2 media campaign tokens onto tiles with project plans tokens. Developers can remove a media campaign by paying 2€. Removed tokens are returned to the conservationist who played them.

Once per turn, a single media campaign on a playing area tile can be turned into a **demonstration** (orange side), by paying 1€ + 1 *[IMAGE: binoc_tiny]*

. The knowledge card must match the nature type of the tile (or be holistic knowledge). Removing a demonstration costs 2€ and a successful die roll of 4-6. Removed tokens are returned to the conservationist who played them.



A demonstration that was made during a previous turn can be turned into a permanent **protest camp blocking the whole project**, by paying 4€ + 1K. The knowledge card must match the nature type of the tile (or be holistic knowledge). When a protest camp is established, the demonstration token is moved onto the project header token of the same project. A protest camp can be established **only once per game**. It is not possible to remove the protest camp.

Other actions

Playing an action card

Players can choose to play one action card from their hand during their turn. Some action cards with the symbol *[IMAGE: hand_tiny]* can only be played during the permit process. These cards can be played even during another player's turn.

Negotiating and trading

Players can negotiate any kind of deal or trade any cards in their hand with any players at any time during the game, even when it's not their turn. However, players cannot have more than seven cards in their hand at any time.

End of turn

Discarding

If a player has more than seven cards at the end of their turn, they must discard down to seven cards. A player can also voluntarily discard one card, even if they have less than seven cards in hand.

Drawing cards

The player fills their hand up to 5 cards. Conservationists can only draw cards from the main deck (including the three face-up cards next to the main deck). Developers can take cards from both the main deck and the funding deck.

After drawing, replace any drawn face-up cards with cards from the top of the main deck, up to three face-up cards.

After this the turn passes clockwise to the next player.

6. End of the game

The game ends after 5 rounds in a 6 player game and after 7 rounds in a 4 player game. The final score is calculated after the final round.

(see photo)

Calculating the Score

Keep track of the points with the score tracker during the game. At the beginning of the game, the developers start from 0 points and the conservationists start from 5 points.

Developers

Developer team points

The developer team starts from zero points at the beginning of the game. They gain points for each constructed project token. Each constructed project token is worth **one point, plus one extra point** for each developer role in the game that benefits from it (sustainable / profitable / sector). –

The benefitting roles are marked on the project header tile. Thus, in a six-player game, each constructed project token can bring up to three extra points, if two developer roles benefit from it.

Table [SEE TABLE IN THE POINT REFERENCE CARD, TO USE THE SAME ORDER]: Team points for the developer team (score tracker):

+1 / any constructed project token

+1/ each profitable constructed project token

+1/ each sustainable constructed project token

+1/ each constructed sector project token based on which sector developer is in play

+1 (max 1): cluster of at least 3 constructed tokens (tokens need to follow each other horizontally or vertically diagonals do not count towards a cluster).

Examples (with **images**):

Example 1:

Two separate projects

Filthy rich money maker (profitable) and start-up dreamer (sustainable) are in the game

The developers constructed three project tokens of a motorway (profitable) and two tokens of a wind power plant (sustainable), which equals to five constructed project tokens in total. The developer team gets +5 points for the five constructed tokens, +3 points for the three profitable motorway tokens, +2 points for the two sustainable wind power plant tokens, and +1 for the three clustered motorway tokens. In total, the developer team has 11 points.

[IMAGE: scoring_example_1]

Example 2:

Three separate projects

Filthy rich money maker (profitable) and start-up dreamer (sustainable) are in the game:

The developers constructed three tokens of a motorway, two tokens of a wind power plant and one token of an ecological housing area, which equals to six constructed project tokens in total. The developer team gets +6 points for the six constructed tokens, +3 for the three profitable motorway tokens, +2 for the two sustainable wind power plant tokens, and +1 for the sustainable ecological housing area token. In this situation, all projects are clustered together (6 tokens) so it brings +1 points. In total, the developer team has 13 points.

[IMAGE: scoring_example_2]

Example 3:

Two projects, three developers: One joint project and one separate project

Filthy rich money maker (profitable), start-up dreamer (sustainable) and a sector developer (mobile opportunist in this example) are in the game

Developers constructed three tokens of a motorway and two tokens of a wind power plant, which equals to five constructed project tokens in total. The developer team gets +5 points for the five constructed tokens, $3+3=6$ for the three constructed motorway tokens (the filthy rich money maker benefits from the project being profitable and the mobile opportunist benefits from the project belonging to the mobility sector), +2 for the two sustainable wind power plant tokens, and +1 for the three clustered motorway tokens. In total, the developer team has 14 points.

[IMAGE: scoring_example_3]

Example 4:

Two joint projects, three developers

Filthy rich money maker, start-up dreamer and a sector developer (mobile opportunist in

this example) are in the game

Developers constructed three tokens of a motorway and two tokens of a tram, altogether five constructed project tokens. The developer team gets: +5 points for all the five constructed tokens, $3+3=6$ for the three constructed motorway tokens (the filthy rich money maker benefits from the project being profitable and the mobile opportunist benefits from the project belonging to the mobility sector), $2+2=4$ for the two constructed tram tokens (the start-up dreamer benefits from the project being sustainable and the mobile opportunist benefits from the project belonging to the mobility sector), and +1 points for the three clustered motorway tokens. In total, the developer team has 16 points.

[IMAGE: scoring_example_4]

Example 5:

One project, no extra points for anyone

Filthy rich money maker, start-up dreamer and a sector developer (mobile opportunist in this example) are in the game.

Developers constructed three tokens of a Lithium mine. The lithium mine is neither sustainable nor profitable. There are no sector developer roles who would benefit from this project (no energetic futurist or cynical materialist) either, so the developer team only gets +3 points from the three constructed project tokens and +1 for them being in a cluster. In total, the developer team has 4 points.

[IMAGE: scoring_example_5]

Conservationist points

Conservationist team points

The conservationist team starts from 5 points at the beginning of the game. The conservationist team can both lose and gain points from different actions.

The conservation camp **always loses one point when a nature tile (with or without a species, but not polluted land) is removed from the play area**. A nature tile can be lost as a consequence of the construction of project tokens, but also when some action cards are used, such as "Oops", "Derogation" or "Corruption".

The conservationist team gets +1 points for each completed offsetting site (offsetting token dark side up). This means that if a nature tile is lost due to construction but is offset, the total points lost and gained are $-1+1=0$. If the lost tile is offset with the ratio of 2, the total points lost and gained are $-1+2=1$. If there is no offsetting, conservationists simply lose one point (-1).

The conservationist team gets +1 points when all the nature tiles on the game board have been opened face up.

The conservationist team gets +1 points if more than half of the constructed project tokens belong to sustainable projects (projects that have the sustainable symbol on the project header tile).

Each conservation area (dark green side) gives +1 points. Each restoration site (brown token) gives +2 points.

If any of these tokens (conservation, offsetting, restoration) **form a cluster of three** (adjacent tiles, not diagonal), then the team gets +1 points (only 1 cluster per game).

Each demonstration token (orange side), even if later removed, gives +3 points to the conservationist team. Each protest camp (upgrade from demonstration - demonstration token on the project header tile, blocking the whole project) gives an additional +2 points to the conservationist team on top of the +3 from the demonstration.

Table: Team points for conservationists (score tracker)

-1 destroyed nature tile

+1 For all nature tiles being open

+1 When there are more sustainable constructed project tokens than other constructed tokens

+1 For each conservation area tile (dark green side)

+1 For each offsetting site (on the game board or in the offsetting bank) (dark green side)

+2 For each restoration site (brown token)

+1 (max 1) for a cluster of at least 3 conservation areas / offsetting sites / restoration areas (adjacent, not diagonal).

+3 For each demonstration (even if removed later or turned into a protest camp)

+2 When a demonstration is turned into a protest camp

Example 1

End situation

[IMAGE: end_situation_scoring_example]

Three conservationist roles (burned out birder, enthusiastic planet saver and extinction rebel).

The conservationist team starts with 5 points.

The conservationist team loses 6 points because six nature tiles have been constructed by the development team ($5-6=-1$). They lose also 1 point because one species tile was destroyed without offsetting. The conservationist team gets +3 points for the three conservation areas (no points from conservation proposals). They get +2 points for the two offsetting sites on empty / species tiles and +2 points for one offsetting site on a polluted land tile. The conservationist team gets +2 points for one restoration site and $3+2=5$ for the protest camp (+3 from the demonstration that became a protest camp (+2) and no points for the media campaigns). They also get +1 point for the cluster of one offsetting site and two conservation areas.

The conservation team also gets +1 point because all nature tiles are open (face up) and +1 point because there are more sustainable constructed project tokens than other constructed tokens. In total, the conservation team gets 15 points.

7. Terminology

Game terms

Game area / game board =

Resource cost = This tells how many resource cards a player needs to discard in order to conduct the action.

Knowledge cost = This tells how many knowledge cards a player needs to discard in order to conduct the action. Knowledge cost is represented with a knowledge symbol (🧠) and a number, for example 🧠2.

Funding deck

Main deck

Permit deck. This is a deck of 17 permit cards used in the permit process to determine if a project plan laid out on the game board gets accepted or denied by the permit authorities. (See permit process: pg. XX)

Offsetting terms

Offsetting: Biodiversity offsetting is a nature conservation and land-use planning tool used to offset harmful impacts to local biodiversity caused by project construction. This damage is offset beforehand through the improvement or restoration of similar nature elsewhere.

Mitigation hierarchy: Preferred hierarchy of damage mitigation. When possible, harmful impacts to biodiversity should be completely avoided, then reduced as much as possible and only the last remaining unavoidable damage should be offset.

Offsetting bank: Offsetting banks manage land for nature restoration in anticipation of development projects. Offsetting services are then sold to developers to offset their impacts.

Offsetting ratio: The size of the restored area compared to the destroyed area. Ratios increase for species with higher conservation issues and uncertainty of restoration processes.

Ordinary nature: Often defined in opposition to nature valued for conservation or heritage purposes, "ordinary nature" means non-protected species and ecosystems heavily transformed by human activities.

Conservation area: An area with conservation value that is being protected against degradation.

Protest camps: Camps set up by activists to oppose to development and offsetting projects.

No net loss: Offsetting and the mitigation hierarchy aim to achieve no net loss of biodiversity despite economic development and degradation of natural areas.

Ecological restoration: Practices of restoring degraded and damaged ecosystems.

Like-for-like: Ecological similarity (equivalence) between impacted and restored habitats.

8. Simulating biodiversity offsetting

Biodiversity, nature conservation and biodiversity offsetting can be simulated in a game in many different ways. We have chosen to simulate how biodiversity offsetting is connected to the practices, conflicts and dynamics of land-use planning, nature conservation, development and use

of natural resources. We chose to simulate the controversies that biodiversity offsetting creates. The game presents the main mechanics of offsetting.

Offsetting often only targets **protected species**, because surveying, evaluating and offsetting all the biodiversity in an area is impossible in practice. In the game, when a protected species is impacted by a project, it needs to be offset by restoring another, similar habitat. This can be conducted either during the projects (**offsetting by demand**) or before the projects when habitats are restored and offsetting units are sold afterwards (offsetting by offer, also called **offsetting banks**). In both cases, the construction permit needs to be granted by the administration after conducting species surveys and conservationists can always conduct additional surveys to contest existing ones. Offsetting respects the **mitigation hierarchy** and is only conducted for damage that is left after the majority of impacts to the ecosystem have been first avoided or at least reduced. The game also introduces different principles of organising the implementation of offsetting: different offsetting ratios for species, offsetting with similar (like-for-like) or non-similar (out-of-like) habitat, voluntary offsetting, and mandatory offsetting for all kinds of nature, including ordinary nature with no protected species.

In addition, our game presents different controversies related to the implementation of offsetting. Main issues include: land scarcity and difficulty to find areas suitable for offsetting, uncertainty of the restoration process, corruption and destruction of protected species without offsetting, difficulty of guaranteeing the success of offsetting measures over time, and the absence of no-net-loss of biodiversity even if that is the aim of offsetting. Conservationists or local people might oppose development projects, do media campaigns, protests or gather in protest camps.

Our game introduces players to the fundamental dilemma surrounding offsetting: is it better to collaborate, and offset the damages of the projects which would have probably been authorised anyway, even without any offsetting measures? Or is it better oppose projects in all stages because offsetting legitimises projects and gives them a right to destroy nature?

Credits

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Thanks (incomplete!)

Kone foundation

Tampere University

Faculty of management and business, faculty of information technology and communication sciences

To everyone who has participated in the prototype gaming sessions, game development and offsetting research!

POLEIS research seminar

Students at the offsetting game course in autumn 2018 at the University of Tampere

Jere Nieminen, Malla Mattila,

The research team of Thierry Dutoit, Renaud Jaunatre and Adeline Bulot

Participants at the Kone foundation pre-call workshop in the summer 2017

Participants at the Kone foundation workshop in autumn 2018

Participants in our session “Biodiversity offsetting: ideologies, modalities and production of naturecultures” in the 2018 YHYS colloquium, University of Lapland.

Participants in our session at the ECCB2018, Jyväskylä, Finland

Participants in our session at the CRRC2019 conference at Tampere, Finland

Participants in the 2019 conference “Jeux & Enjeux. Jeux et simulations pour l'apprentissage individuel, collectif et organisationnel. Rencontres des praticiens de la simulation participative et du jeu sérieux”, ESPE Marseille, France.

9. Attachment: Species in the game

Siberian Flying squirrel

Siberian flying squirrels (*Pteromys volans*) have caused numerous conservation conflicts and delays in Finland since 1998. Siberian flying squirrel is a nocturnal, arboreal rodent, strictly protected in the EU Habitat directive. They live in Finland in their westernmost edge of their distribution range. They are declining and endangered but relatively common in the mixed forests around cities in Finland.

Moor frog

Moor frog (*Rana arvalis*) is strictly protected in the EU Habitat Directive and thus its breeding sites are protected from destruction. Moor frogs are not rare. Projects that threaten breeding sites of moor frogs have dug new breeding ponds for moor frogs to offset the damages.

Lesser butterfly-orchid

Lesser butterfly-orchid (*Platanthera bifolia*) attracts pollinators at night with its white flowers and strong scent. We chose this flower for the game because it is protected in Finland (and Sweden) from picking and transferring but that doesn't stop its habitats from being destroyed by development projects. Some transfer attempts have been made but offsetting is currently not obligatory, thus the habitats of these orchids continue to be destroyed.

Golden eagle

The golden eagle (*Aquila chrysaetos*) is a big and charismatic bird of prey. It suffers from illegal hunting and persecution, and the lack of nesting sites. Conservation and offsetting measures include building nesting platforms on big pine trees.

Antrodia crassa

Antrodia crassa is a polypore fungus living on fallen, decaying pine trees. Old growth forests with a lot of decaying wood are rare and thus the fungus is a threatened species. In Finland it is protected, and relatively large conservation areas have been founded to protect it, but also new

conservation measures are being tested. In 2019 a forestry company together with researchers was experimenting with the injection of mycelium from this and other species into tree trunks.

False heath fritillary

The false heath fritillary (*Melitaea diamina*) is a medium-sized, widespread butterfly species in Eurasia. We chose this butterfly for the game because in Finland it lives only in few spots and breeds only on one plant, valerian (*Valeriana officinalis*). Successful restoration projects of meadows for false heath fritillary have been done in the Tampere region.

Bechstein's bat

Bechstein's bat (*Myotis bechsteini*) is a widespread, but rare bat species, typically nesting in tree holes of old forests. Protected by the European Habitats Directive, this species can be negatively affected by various development projects, such as windmills. Negative impacts of projects are reduced by preventing bats from staying near the construction sites. New trees can be planted to avoid collisions and deviate their flying patterns to safer areas. The habitats of the bats can also be improved by planting trees, creating areas with old decaying trees and installing artificial boxes to increase the bats' survival rates.

Great capricorn beetle

The great capricorn beetle (*Cerambyx cerdo*) is impressive in size, reaching up to 5,5cm. The larvae of beetle live in the trunks of old oaks (*Quercus robur*). This huge beetle is among the very few beetle species protected in France. When old oaks are cut down, the great capricorn beetle can be offset by displacing the logs in places where the presence of this species has been documented. Logs have to be installed near live trees and their branches should also be placed in the surroundings.

Great diving beetle

The great diving beetle (*Dytiscus latissimus*) is a very rare beetle in Central Europe, sometimes even considered extinct in France, in Germany or in the Benelux. The species is protected by the European Habitats Directive. The great diving beetle lives in lakes, ponds and rivers where it hunts for a variety of prey, including insects, tadpoles and even small fish. Although there are no records of any offsetting experiments for this species, the translocation of individuals and the improvement of water quality are likely to be suitable approaches in the protection of the species.

Marbled newt

The marbled newt (*Triturus marmoratus*) can be encountered in the southwestern parts of Europe. Measuring between 12 and 18cm, the species lives in dark and humid habitats, on land as well as in small water bodies. Scientific studies have shown that these newts use stars to navigate to their breeding pools. If a pond in the species' habitat is destroyed, the species can be offset by creating new ponds and transplanting individuals. The marbled newt has had a key role in conservation measures and compensation controversies, such as the cancelled airport project in Notre-Dame-des-Landes in France and the high speed train line Bordeaux-Toulouse which had to be modified to protect the species.

European otter

Formerly present all over Europe, the European otter (*Lutra lutra*) has severely declined because of hunting, draining of wetlands and water pollution during the 20th century. The species is no longer considered a pest, but an iconic heritage species, that is nowadays protected by national laws and by the European Habitats Directive. This has improved the species' abundance and their populations are slowly recovering. Before development projects, it is important to identify the existing habitats, but also those which the otters could potentially recolonize. During projects, pollution control can prevent the contamination of waterways. Ecological corridors have to be maintained to enable the otter, as well as its prey, to move. When impacted, the otters' habitats can be offset by improving the ecological status of wetlands.

Atlantic salmon

The Atlantic salmon (*Salmo salar*) lives in the Atlantic Ocean but comes back to reproduce in the freshwater rivers, where it was born. The species has become very rare in European rivers due to overfishing and destruction of its habitats. In France, the salmon is almost extinct, except in few areas and is protected by the European Habitats Directive. Rivers where water management projects are constructed need to install fishways to enable salmon to migrate in streams. The destruction of the habitats for salmon can be offset by improving the ecological status in other rivers and streams.

Freshwater pearl mussel

Living up to 250 years old, the freshwater pearl mussel (*Margaritifera margaritifera*) has long been collected for its pearls. However, because of the degradation of water quality in the species' habitat, the species is under serious threat and is today protected by the European Habitats Directive. In France, in one century, the freshwater pearl mussel has disappeared from 60% of the waterways where it was living before. The species is particularly difficult to protect because the larvae host in juvenile fish of the Salmonid family (salmon or sea trout *S. trutta*) during their life cycle. For now, all attempts to transplant individuals have failed. In addition to reducing water pollution during construction projects, promising measures to protect and offset the species include the protection and reintroduction of host fish.

Bee orchid

The bee orchid (*Ophrys apifera*) gets its name by imitating the smell and the shape of a female bee. Once attracted and lured, the bee pollinates the plant. This orchid is threatened when mowing is conducted before seed production. For that reason, late mowing can help to improve the habitats of the bee orchid. In France, the species is not protected nationally, but on a regional basis. Because its conservation status is not poor on a national scale, the offsetting of the species is sometimes not considered to be necessary. Nevertheless, plants can be transplanted to other sites and seeds can be collected for the offsetting projects.

Melancholy Thistle

Found in upland meadows of European mountains, Melancholy Thistle (*Cirsium heterophyllum*) does not have any spines on its stems. During the 17th century, the plant was used as a cure to sadness. The species is regionally protected in France, and it can be offset by transplanting individual plants and improving the local conditions of its habitat.

Ocellated lizard

The ocellated lizard (*Timon lepidus*) can measure up to 60cm and is the largest lizard species in Europe. Living in dry meadows, this lizard can be recognized by the blue spots on its flanks. The species was previously collected for its beauty but is today strictly protected. In France, the ocellated lizard is among the 6 species of reptiles threatened for regional extinction. The main causes of threats are the fragmentation of its habitats caused by urbanization and the decline of extensive sheep farming. In biodiversity offsetting projects, lizards are captured and translocated to new sites where shelters have been constructed by piling up rocks. Cutting down trees to reopen meadows also improves the habitat of the lizard.

Little bustard

The little bustard (*Tetrax tetrax*) is one of the most threatened birds living in cultivated meadows in France. The bird was once intensively hunted, but its population started to decline because of a change in farming practices. In France, the population has decreased by 30% in the last 30 years and the species is now strictly protected. The bird species is offset by restoring meadows and adapting mowing practices to the species' preferences. Land is bought by development companies and contracts are signed with farmers. In France, this bird species was the key species that led to the creation of the first biodiversity offsetting bank (Cossure by CDC biodiversité).

Pin-tailed sandgrouse

The pin-tailed sandgrouse (*Pterocles alchata*) is difficult to observe in the field because of its excellent camouflage. The species lives in dry meadows with very short vegetation height. The degradation of steppe habitats is the main reason of its decline. The bird is strictly protected by French law and the European Birds Directive. In France, the population of this bird is very low and encompasses approximately 100 couples. Although there are no existing examples of offsetting for the pin-tailed sandgrouse, the first French biodiversity offsetting bank managed by CDC Biodiversité is offering offsetting units for this bird. This has been very controversial for the opponents of the bank who think that the habitat for this bird species is almost impossible to restore.

Green gomphid

This almost fluorescent gomphid is a green club-tailed dragonfly (*Ophiogomphus cecilia*) that lives near calm and clear waterways. It is strongly impacted by water pollution and human activities such as material extraction, motorboats and riverbanks' artificialisation. The green gomphid is protected by the European Habitats Directive. Possible offsetting measures include the restoration of ecological corridors and improvement of water quality.

Teacher's guide

Suggested use in teaching

Kompensaatiopeli is suited for teaching and learning about many different subjects. It has been used to teach and learn about biodiversity offsetting, nature conservation conflicts and corporate social responsibility. We recommend reserving 2,5 hours for playing the full game (including discussion about the subject and rule explanations) and at least 30 minutes for debriefing and discussion. The game session can also be shortened and finished earlier.

The game can be used for “flipped classroom”, where the students first read texts about biodiversity offsetting, then play the game, and then the issues are discussed.

It can also be used for problem based learning, for example by playing the game first, followed by debriefing and a lecture and/or reading. However, we suggest asking students before playing if they have already heard about BDO. The subject should be briefly introduced before playing.

If learning about biodiversity offsetting is the goal of the gaming session, we propose that the discussion and teaching after game should include a bit more detailed explanation of biodiversity offsetting and its problems, challenges and mechanisms. However, the game can be used to explore other matters too, such as nature conservation or corporate social responsibility.

Suggestions for reading materials (all open access)

Scientific articles and texts

Apostolopoulou, E. (2019). Biodiversity Offsetting and the Contradictions of the Capitalist Production of Nature. *Arcadia*.

Apostolopoulou, E., & Adams, W. M. (2017). Biodiversity offsetting and conservation: reframing nature to save it. *Oryx*, 51(1), 23-31.

Benabou, S. (2014). Making up for lost nature?: A critical review of the international development of voluntary biodiversity offsets. *Environment and Society*, 5(1), 103-123.

Bonneuil, C. (2015). Tell me where you come from, I will tell you who you are: A genealogy of biodiversity offsetting mechanisms in historical context. *Biological Conservation*, 192, 485-491.

Bull, J. W., Suttle, K. B., Gordon, A., Singh, N. J., & Milner-Gulland, E. J. (2013). Biodiversity offsets in theory and practice. *Oryx*, 47(3), 369-380.

Griffiths, V. F., Bull, J. W., Baker, J., & Milner-Gulland, E. J. (2019). No net loss for people and biodiversity. *Conservation Biology*, 33(1), 76-87.

Ives, C. D., & Bekessy, S. A. (2015). The ethics of offsetting nature. *Frontiers in Ecology and the Environment*, 13(10), 568-573.

Maron, M., Ives, C., Kujala, H., Bull, J.W., Maseky, F.J.F., Bekessy, S. et al. (2016) Taming a wicked problem: resolving controversies in biodiversity offsetting. *BioScience*, 66, 489–498.

Moilanen, A., & Kotiaho, J. S. (2018). *Planning biodiversity offsets: Twelve operationally important decisions*. Nordisk Ministerråd. (open access)

Other material

Fauna & Flora international: What is biodiversity offsetting? <https://youtu.be/B1pOOsxfoOM>

Gordo.it: Biodiversity offsetting. <https://youtu.be/n34NY5iBqR4>

Fauna & Flora International: Biodiversity offsetting – learning from success and failure. <https://www.fauna-flora.org/news/biodiversity-offsetting-learning-from-success-and-failure>

Suggestions for debriefing questions

Feelings

The game often raises feelings of frustration and joy. It is good to discuss the negative and positive emotions that they players felt during playing.

How did you feel about playing your role?

How did you feel about the other roles?

Biodiversity offsetting

Biodiversity offsetting is a controversial tool and there are uncertainties regarding its use. One of the organising principles of BDO is the idea that by restoring nature, you offset the damages and reach a no net loss of biodiversity. Moreover, there are other important BDO principles present in the game, such as mitigation hierarchy (first avoid damage, then reduce damage, then offset damage), additionality (is it used to fund something that would be done anyway?) and long-term duration (will the offsetting measures last?). These issues can be explored by explaining these principles and going through events in the game and discussing them as a group.

What do you think about biodiversity offsetting as a tool for nature conservation? (what seems to work, what does not, what are the conflicts of interest between different actors)

What do you think about biodiversity offsetting as a tool for land-use planning and development?

Was there a **net loss of biodiversity** in the game even if offsetting aims at no net loss? What about in reality?

Mitigation hierarchy means that damage to nature should be first avoided, then mitigated and only then offset. How do you think this hierarchy was present in the game? What about in reality?

Additionality means that biodiversity offsetting should be made **in addition to** other, obligatory conservation measures and it should not **replace** them. Do you think this happened in the game? What about in reality?

Which implementation difficulties can you see through your game experience?

Suggestions:

Stability over time (what happens to the offsetting sites in 30 years?)

Spatial proximity (is it good or bad if the offsetting project is close to the damaged area?)

Obligation of results (is it possible to destroy nature before offsetting is complete? Are there offsetting check-ups? What happens if an offsetting project fails?)

Offsetting by offer (offsetting bank) /demand (separate projects) - pros and cons

Corruption and accidents (do you think they happen in reality? What can be done to counter them?)

Development, decoupling and de-growth

There are elements in the game that can lead to discussion about sustainable development (eg. what is sustainability or corporate responsibility?), decoupling (is it possible to decouple economic growth from growing resource use and biodiversity loss?) and degrowth (is it a desirable goal? Why / why not?)

Which projects in the game do you think are necessary in real life?

What is the difference between sustainable and profitable projects in the game? What do you think about sustainable development projects in real life?

Why do you think this area (as stated in the narrative) is the last reserve for these species? What is the cause of that?

End result

How many species went regionally extinct? (tiles set aside without offsetting)

What do you think about the end game situation and the ratio between development and loss of biodiversity? Is it acceptable? Why / why not?

How do you imagine the future of this area? Will there be more development? Why / why not?

What do you think could be done to prevent further biodiversity loss?