7 DAY MANGROVE

Developed by: Adam McKnight

Geneva Isaacson, Gianluca Panza

Number of players: 3

Age Range: 12+

Game Environment: Tabletop - indoors/outdoors

Necessary material/equipment: Game board, cards, tokens, D8 (eight sided) dice - either a physical die or virtual one through a site such as
https://rolladie.net/roll-a-d8-die

Learning outcomes:

- Mangroves can protect the community against a storm surge
- Understand the three types of mangroves found in the intertidal region
- Understand common threats to mangroves in the community
- Understand how a reforestation effort can help the mangrove population
  - Understand the utility of aspects of the reforestation process such as volunteers and the use of a nursery

7 Day Mangrove

Style: Cooperative board game

Concept: Plant mangroves over 7 turns before a great storm hits the board. These mangroves will protect your town from the storm. Careful resource management is needed over the 7 turns to grow a mangrove forest while also dealing with random events.

Learning Objectives:
- The different types of mangroves, and where they are found relative to nearby bodies of water.
- How mangroves protect communities from storm surges during a storm
- Threats to mangroves from human activities
    - Threats include logging, contamination, development, boating waves, and salinity changes which are threats to mangroves in the Piñones community and Puerto Rico
- The importance of reforestation for helping the community resist flooding, the use of a nursery for reforestation in Piñones. Reforestation practices like using boulders to shield plants, volunteers, the role of the ecosystem with termites.

Materials Required:
- Printouts of the cards, game board, and tokens for seeds, saplings, mangroves, and event-related tokens. Printing these on cardstock or backing with cardboard will make gameplay easier outside. Use of magnetic strips on tokens and zones on the gameboard will also help.
    - Will need 3 housing tokens, 8 contamination tokens, 4 developer tokens, 8 mangrove tokens for each type, 16 seed tokens for each type, and 16 sapling tokens for each type. Printout sheets will have the correct number
    - 33 total cards are printed, the amounts are listed at the end of the event card section.
- *An eight-sided, or D8, die is required*. This is a special dice that may be purchased in the games section of large retail stores, or more often found in specialty games stores dedicated towards board games and role-playing games.
    - If there is difficulty acquiring a D8, a virtual die may be used instead, by searching "roll a D8" in google search, or through a dice-rolling website such as **https://rolladie.net/roll-a-d8-die**
    - Alternatively, a D8 die may be folded and glued together using a paper cutout

Gameplay Description:
Protect your community from the storm through reforestation!
Up to 3 players will manage three rows of mangroves representing black, white, and red mangroves along the coast of a town off a lagoon. Each turn players will roll a die to determine how many seeds they will be given that turn. Players may choose to invest their seeds in the nursery, or save them for later, before drawing a random card that will display an event which may hurt or help the mangrove forest. The player may then choose to plant any seeds or saplings they possess in the forest, use any saved cards they have, or save their seeds/saplings/cards for the next turn. Your mangrove seeds will grow to saplings, which will finally grow to fully developed mangroves. Only these fully developed mangroves are capable of protecting your community!

Board Setup/Rules:
Each player chooses which mangrove species they will represent, for example the red mangrove player will use red mangrove seeds and saplings, and may *only* plant in their respective row. Each row is composed of eight zones, numbered 1 to 8. The row closest to the community is black mangroves, the middle row is white mangroves, and the row facing the lagoon is red mangroves. *Three house tokens are placed in the community*; at the end of the game, a house token is lost to the storm surge if not enough developed mangroves are present in a column. If all three house tokens are lost, then players lose the game as they did not develop a strong enough mangrove forest, and were unable to protect their community!
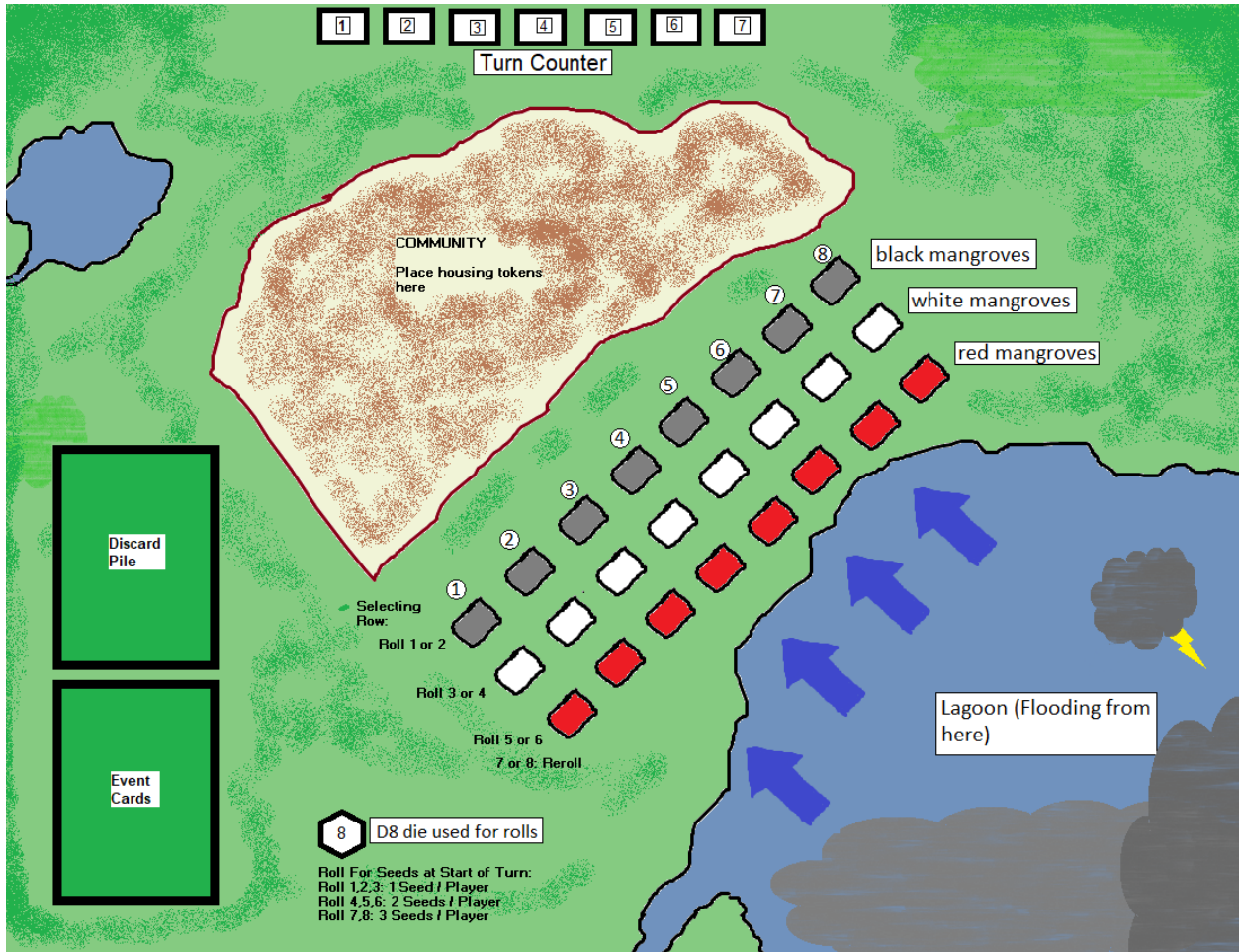
Game Board

Rolling for seeds!

At the start of every turn, the players head out together to collect seeds. To represent this, the players choose one player to roll for the group to determine how many seeds will be allotted to each player!

- Rolling a 1,2, or 3 will mean each player receives 1 seed this turn
- Rolling a 4,5, or 6 will mean each player receives 2 seeds this turn
- Rolling a 7 or 8 will mean each player receives 3 seeds this turn

For example, at the start of a turn the chosen player rolls 4. This means each player will be given two seeds.

Nursery:

The nursery is a critical component of the game. *As opposed to directly planting seeds, players may instead choose to place their seeds in the nursery to allow them to develop into a sapling the following turn*. The nursery provides a chance to increase the amount of saplings received from the invested seeds. At the start of the turn, each player rolls for the chance to *double* the amount of saplings they collect from the nursery. Space is limited, and only six seeds total can be placed inside the nursery each turn. The nursery is not without risk, and players must be careful as their seeds will be lost if someone draws an event card where they forgot to water them!

- Players may only choose to invest seeds into the nursery *prior* to drawing their event card.
- Players collect one sapling/seed if they roll a 1,2,3, or 4. Players collect two saplings/seed if they roll a 5,6,7, or 8
- Use of the nursery is optional, players may instead plant seeds directly in their zones. However, waves from high speed boats will kill seeds in the zones they affect!

NURSERY

Invest seeds – max of 6
Each player rolls next turn for saplings
Roll 1,2,3,4 = 1 sapling / seed
Roll 5,6,7,8 = 2 sapling / seed

Event Cards:

After choosing to invest seeds in the nursery for saplings, the player must draw an event card. Event cards will often randomly target a zone. To select what zone is targeted, the rolling of an eight sided die, or D8, is required. As zones are categorized by row and column, two rolls are performed:

- **First roll:** *Selecting row*: Roll 1-2: Black Mangroves, Roll 3-4: White Mangroves, Roll 5-6: Red Mangroves, Roll 7-8: Reroll until a row is selected.
- **Second roll:** *Selecting zone,* The zone within the row is selected by the number rolled.

- *For example, the <u>first roll</u> resulted in a 4, which selects row 2, the white mangrove row. The <u>second roll</u> resulted in a 6, which selects the white mangrove zone 6.*

Example:
First roll: 4 → Row 2 selected
Second roll: 6 → Zone 6 selected
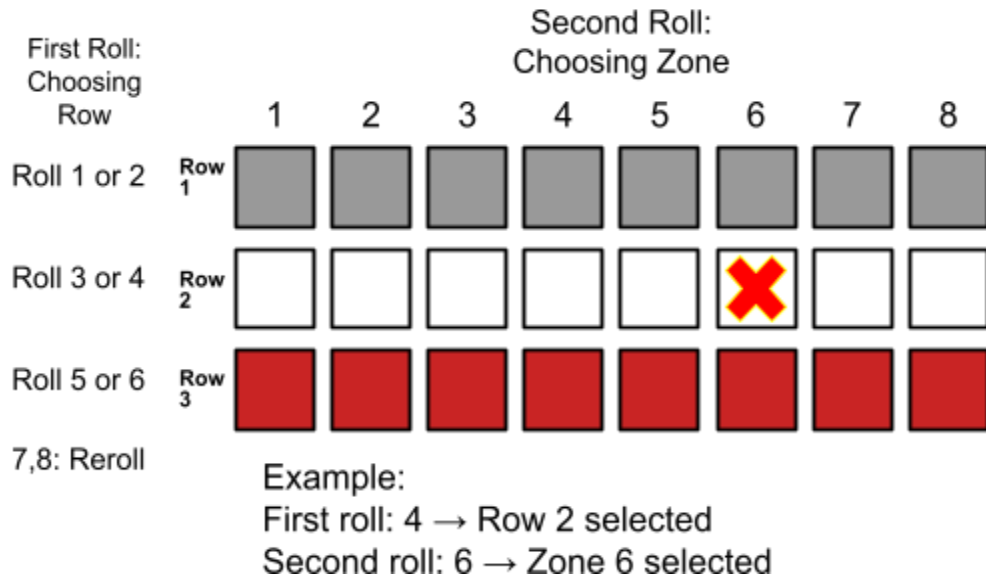
Negative Token Event Cards:
Event cards such as contamination or developers places their respective tokens over the zone they affect:
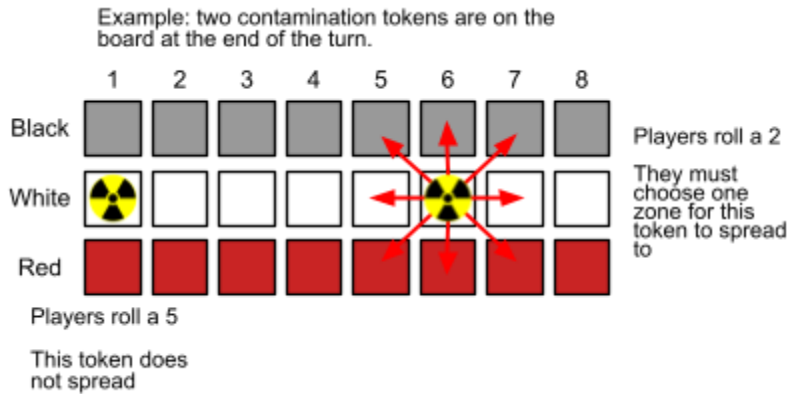
- **Contamination:** *unoccupied zone*: the contamination token will block any planting until removed. *Occupied zone:* the contamination token will *revert* one stage of growth on the zone at the end of each turn until the mangrove is destroyed (ex: a sapling will be converted to a seed at the end of a turn). The contamination will remain after the mangrove is destroyed.
  - If contamination is present at the end of the turn, players must roll to determine if the contamination spreads. If the players roll 1,2,3, or 4 the contamination spreads and they must choose a zone adjacent to it to add another contamination token.
  - If players roll 5,6,7, or 8 then the contamination does not spread this turn.
  - This process is repeated for each contamination.
  - 2 seeds are required to clean up contamination in a zone. Saplings count as the equivalent of two seeds.

Example: two contamination tokens are on the board at the end of the turn.

	1	2	3	4	5	6	7	8
Black									Players roll a 2
White	☢					☢			They must choose one zone for this token to spread to
Red								

Players roll a 5

This token does not spread

- **Developers:** the developer token will *destroy* anything on the affected zone, and will prevent planting until removed.
    - 3 seeds are required to fight the developers and remove the building. Saplings count as two seeds
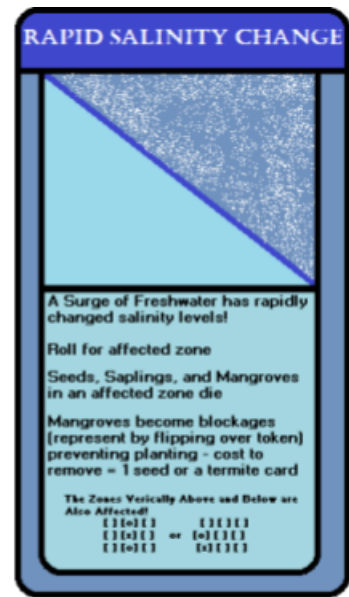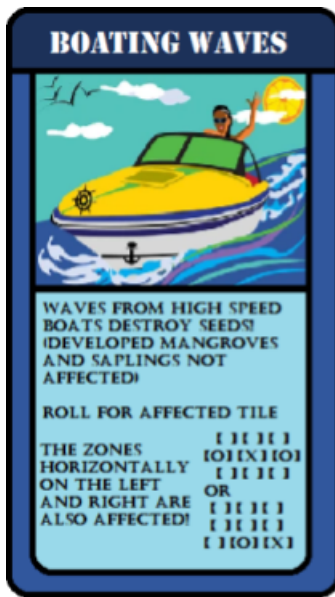
Developer Token

Negative event cards that place event tokens on the boardmap

Negative Area Event Cards: Cards such as logging, rapid salinity change, and boating waves affect *three* zones in a line centered at a random zone, either vertically or horizontally.

The center for horizontal and vertical effects are highlighted in <mark>yellow</mark>. *Note that on edges only two zones are affected.*

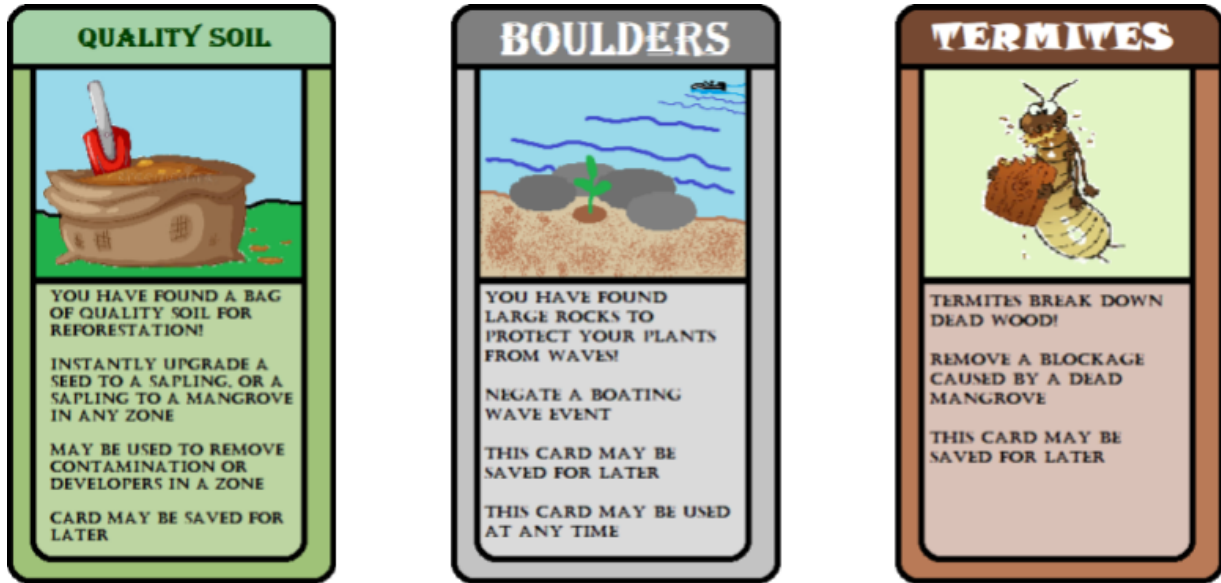|	1	2	3	4	5	6	7	8
Black	✖	✖	✖			✖		✖
White						✖		✖
Red	✖	✖				✖		

- **Rapid salinity change:** not only will this card kill mangroves, seeds, and saplings, but it will also turn mangroves into blockages of dead trees. This is represented by flipping over the mangrove token, and will block planting until removed with either a seed, or a termite card.

BOATING WAVES

WAVES FROM HIGH SPEED BOATS DESTROY SEEDS! (DEVELOPED MANGROVES AND SAPLINGS NOT AFFECTED)

ROLL FOR AFFECTED TILE

THE ZONES HORIZONTALLY ON THE LEFT AND RIGHT ARE ALSO AFFECTED!

```
[ ][ ][ ]
[O][X][O]
[ ][ ][ ]
   OR
[ ][ ][ ]
[ ][ ][ ]
[ ][O][X]
```

ILLEGAL LOGGING

ILLEGAL LOGGING ACTIVITES DESTROY MANGROVES AND TRAMPLE SAPLINGS! (SEEDS NOT AFFECTED)

ROLL FOR AFFECTED ZONE

THE ZONES VERTICALLY ABOVE AND BELOW ARE ALSO AFFECTED!

```
[ ][O][ ]
[ ][X][ ]
[ ][O][ ]
   OR
[ ][ ][ ]
[O][ ][ ]
[X][ ][ ]
```

RAPID SALINITY CHANGE

A Surge of Freshwater has rapidly changed salinity levels!

Roll for affected zone

Seeds, Saplings, and Mangroves in an affected zone die

Mangroves become blockages (represent by flipping over token) preventing planting - cost to remove = 1 seed or a termite card

The Zones Vertically Above and Below are Also Affected!

```
[ ][o][ ]    [ ][ ][ ]
[ ][o][ ] or [o][ ][ ]
[ ][o][ ]    [o][ ][ ]
```

Negative event cards that impact an area

Player Benefit Event Cards:
Cards such as quality soil, termites, and boulders may be saved by players for use at a later time. Of these, boulders may be used at any time to counter a boating wave event, while termites and quality soil may only be used during the player's turn.

QUALITY SOIL

YOU HAVE FOUND A BAG OF QUALITY SOIL FOR REFORESTATION!

INSTANTLY UPGRADE A SEED TO A SAPLING, OR A SAPLING TO A MANGROVE IN ANY ZONE

MAY BE USED TO REMOVE CONTAMINATION OR DEVELOPERS IN A ZONE

CARD MAY BE SAVED FOR LATER

BOULDERS

YOU HAVE FOUND LARGE ROCKS TO PROTECT YOUR PLANTS FROM WAVES!

NEGATE A BOATING WAVE EVENT

THIS CARD MAY BE SAVED FOR LATER

THIS CARD MAY BE USED AT ANY TIME

TERMITES

TERMITES BREAK DOWN DEAD WOOD!

REMOVE A BLOCKAGE CAUSED BY A DEAD MANGROVE

THIS CARD MAY BE SAVED FOR LATER

Event cards players can save and use

Other Event Cards:

The community volunteers card is a beneficial event card that affects a single zone. The nursery failure card is a negative event card that kills any seeds present in the nursery.

NURSERY FAILURE

SOMEONE FORGOT TO WATER THE NURSERY!

ALL SEEDS IN THE NURSERY ARE LOST

Community Volunteers

VOLUNTEERS HAVE PLANTED MANGROVES!

ROLL FOR AFFECTED ZONE

A SEED IS PLANTED ON THE ZONE. IF THE ZONE ALREADY HAS A PLANT IT WILL BE UPGRADED TO THE NEXT STAGE OF GROWTH.

THIS WILL CLEAR ANY CONTAMINATION OR DEVELOPERS ON THE ZONE

Number of Cards: (Logging, Boating Waves, Salinity Change are split 50/50 between horizontal and vertical effect cards).

Card	Logging	Boating	Salinity	Developers	Contam.	Q Soil	Boulders	Termites	Nursery F	Volunteers
Number	4	4	4	4	4	3	2	2	2	4

Turn Directions: Must be followed in this order!

<u>START OF TURN</u>

1. A player rolls for seeds for the entire group
2. Players who invested seeds in the nursery the previous turn roll for the double bonus, and collect their saplings
3. Player 1 starts:
    a. Chooses whether or not to invest in the nursery
    b. Draws card - follows directions
    c. Places remaining seeds/saplings to their zones or to address an event
    d. Player 1 ends turn
4. Player 2 starts:
    a. Chooses whether or not to invest in the nursery
    b. Draws card - follows directions
    c. Places remaining seeds/saplings to their zones or to address an event
    d. Player 2 ends turn
5. Player 3 starts:
    a. Chooses whether or not to invest in the nursery
    b. Draws card - follows directions
    c. Places remaining seeds/saplings to their zones or to address an event
    d. Player 4 ends turn
6. Mangrove saplings in zones are developed into mangroves
7. Mangrove seeds in zones and Nursery seeds are developed into saplings
8. The contamination end turn condition applies (if contamination is on the board), where players must roll for each contamination token to see if it spreads, and choose where it spreads to.

<u>TURN END</u>

End of the 7th day:
- After player 3 finishes, all of the players are given the option to place down any remaining seeds or saplings they have in their possession, and use any cards they still have.
- The rest of the end turn conditions apply as normal - saplings grow to mangroves, contamination spreads, etc.
- The storm hits, and a storm surge from the lagoon is headed to the community!
- A surge will travel down each of the 8 columns. It will take at least two developed mangroves to stop the wave (so at least two out of three zones in the column need to have a mangrove). *Seeds and saplings will be unable to stop these waves*! If a column of mangroves is breached then one of the house tokens is destroyed (these represent player lives). If all three are destroyed, your mangrove forest was not developed enough and the community was not protected!

Waves are only stopped by two or more mangroves

Debrief Questions:
What did you learn about the different types of mangroves?
What did you learn about how mangroves protect the community?
What threats did you recognize to mangroves?
- Which of these were man made?
- Which of these were naturally caused
How did these threats affect your goal of reforesting?
- How do you think this relates to real life?
What reforesting techniques did you learn about?
- What is the purpose of a nursery for reforestation? What did you learn about using the nursery?
- What other techniques did you recognize?
What helped the mangroves apart from direct reforestation?