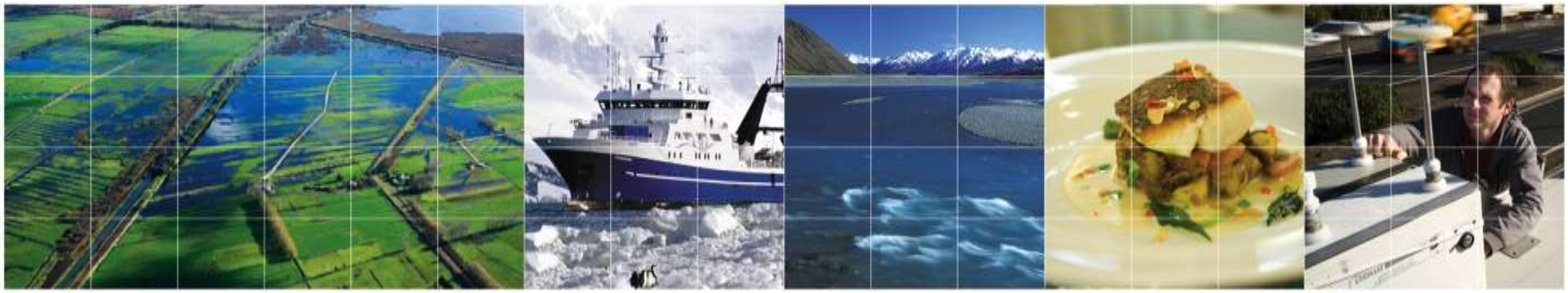
NIWA
Taihoro Nukurangi

Adaptive and interactive futures: A 'serious game' for coastal community engagement and decision-making

Kate Davies, Paula Blackett, Nick Cradock-Henry, Stephen Flood and Ben Davies



Clockwise from top left: Coastal cliffs at Oamaru (2007), Murray Hicks; Traffic on Portland Road, Remuera, Auckland (23 January 2011), Steven McNicholl; Floodwaters surround farmhouses (2007), Alan Blacklock; Kayaking on Tamaki Drive, Auckland, Courtney Agate.

Serious games for climate change adaptation

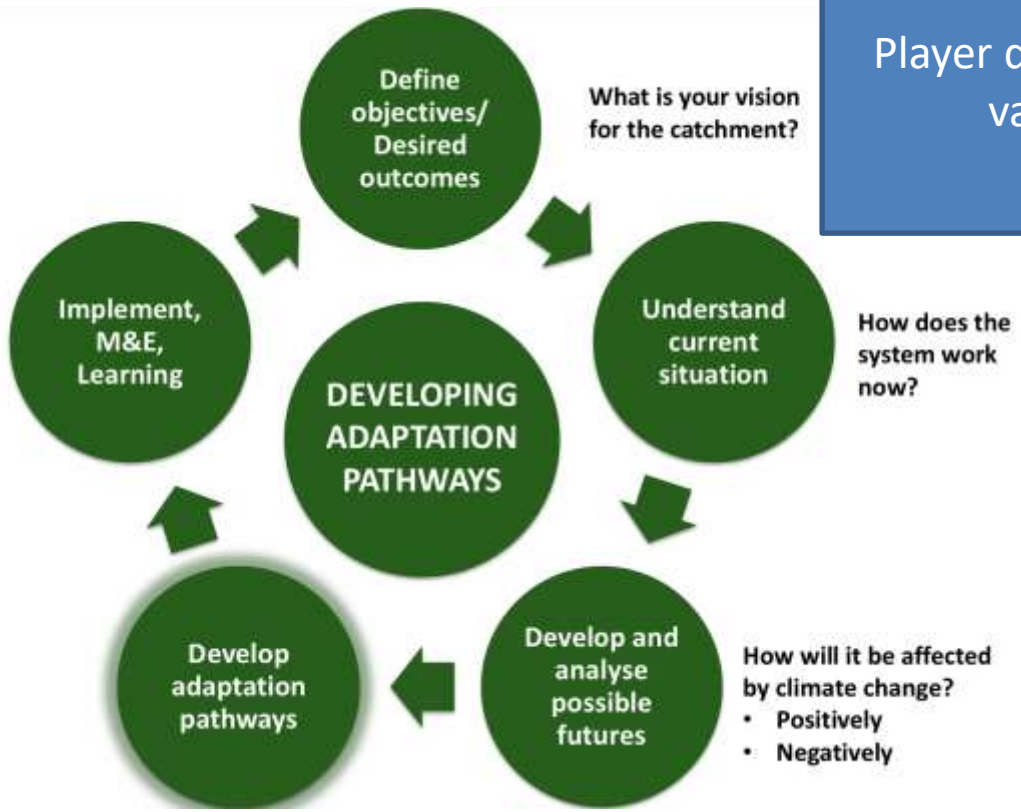
‘Serious Games’ or simulations that are used for purposes beyond entertainment can:

1) Teach diverse players about climate change and related challenges
2) Encourage players to consider alternative ways forward and trial innovative approaches

(Flood et al. 2018 *doi:10.1088/1748-9326*)

Serious games for climate change adaptation

How did it work? Where the desired outcomes achieved?



Player determines values

Informed by biophysical and social science, cultural values, economics, etc.

Map: https://www.hbrc.govt.nz/. Image: Silt deposits remaining after Cyclone Bola (1988), with Tangaio marae complex highlighted, Hawke's Bay Regional Council.


10-20yrs
20-30yrs
30-40yrs
40-50yrs
50-60yrs
60-70yrs
70-80yrs
1
2
3
4
5
6

Reaching a wider audience

- Board game platform benefits from expert facilitation and encourages social learning, **limited in terms of reach and customization**
- Online games provide an **opportunity to broaden audience** of serious games and tailor games to individual player backgrounds or interests

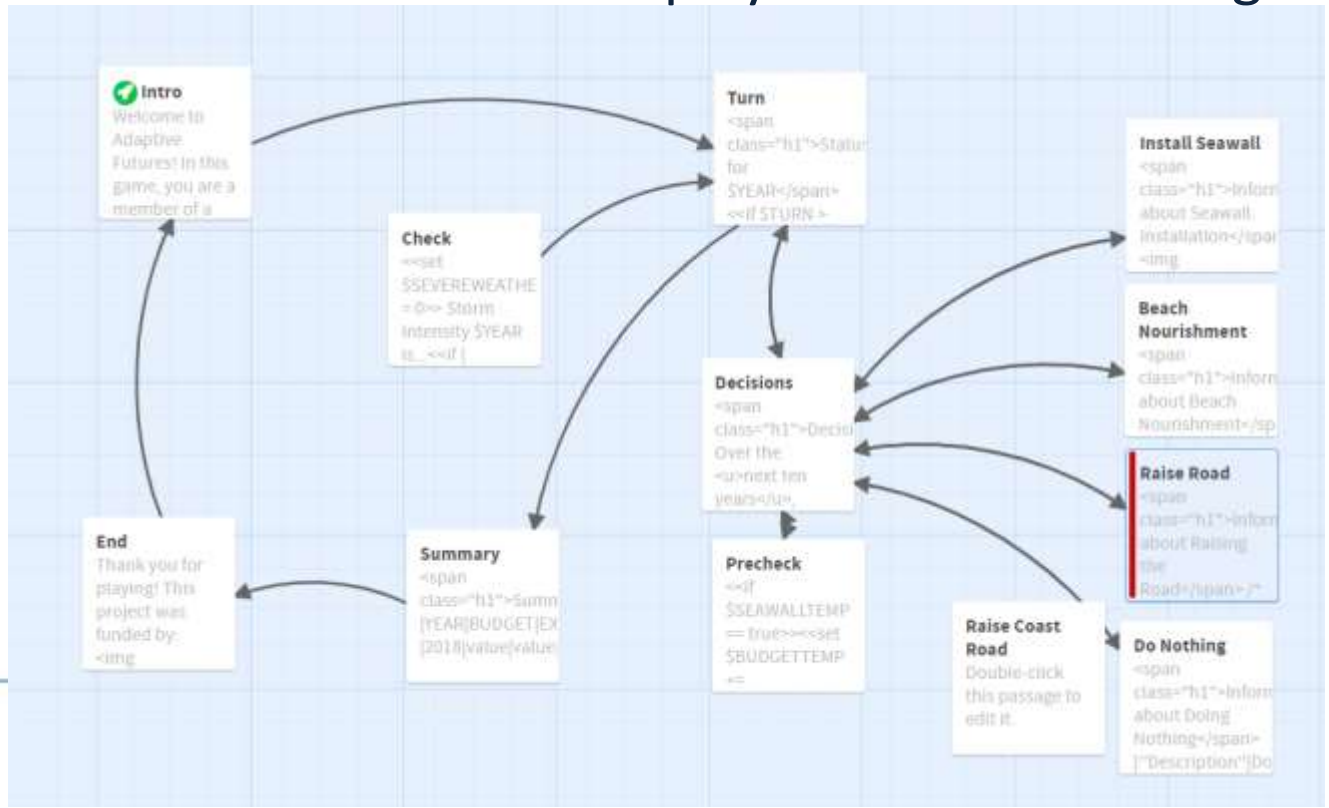
NATURAL HAZARDS RESEARCH PLATFORM

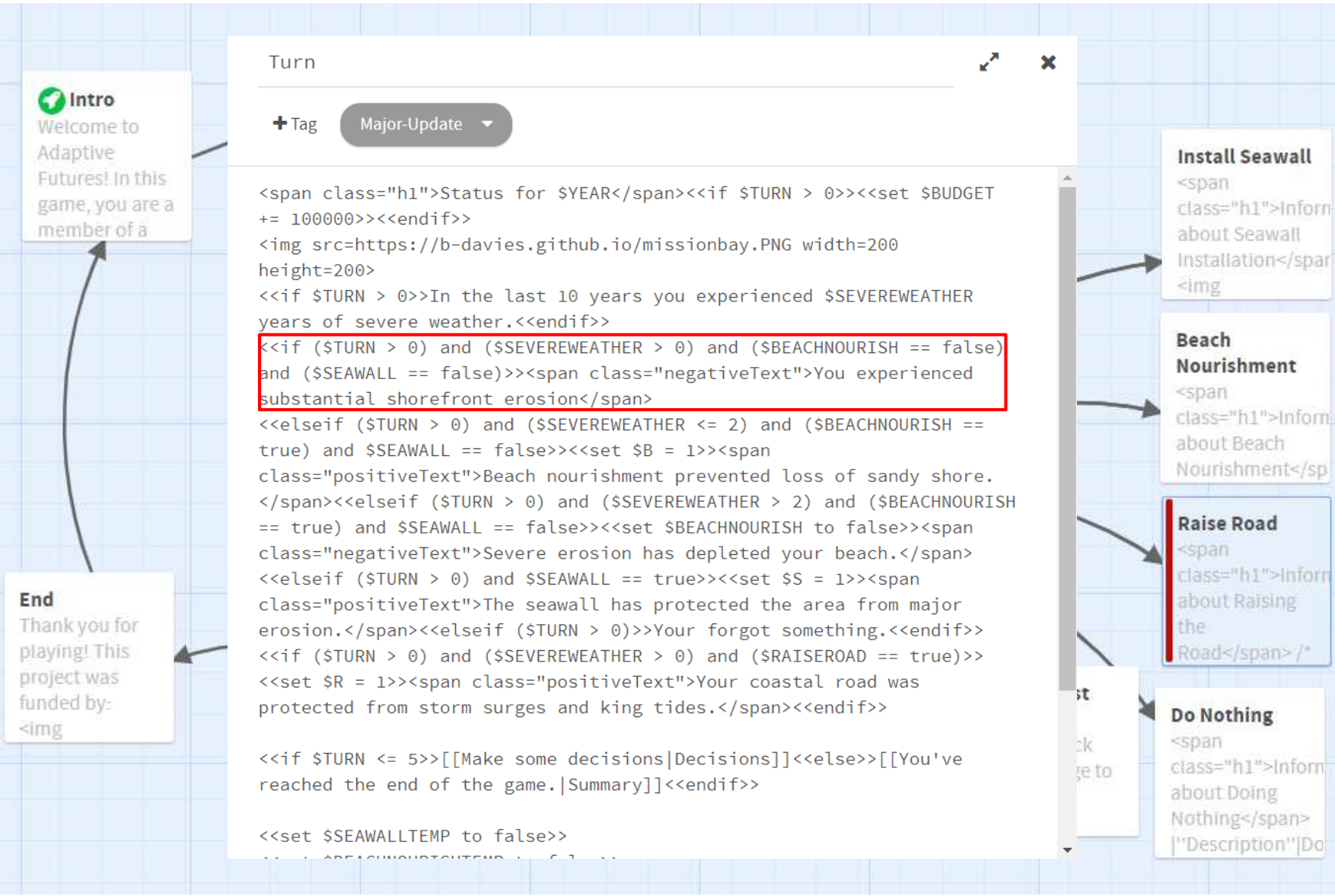
Serious games with Twine

- An open-source tool for telling interactive, nonlinear stories
- Players navigate through multiple potential storylines
- Variables such as degrees of erosion, current funding, and satisfaction of stakeholders can influence player decision-making

Twine

twinery.org




Turn
+ Tag
Major-Update
Status for $YEAR<<if $TURN > 0>><<set $BUDGET
+= 100000>><<endif>>
<img src=https://b-davies.github.io/missionbay.PNG width=200
height=200>
<<if $TURN > 0>>In the last 10 years you experienced $SEVEREWEATHER
years of severe weather.<<endif>>
<<if ($TURN > 0) and ($SEVEREWEATHER > 0) and ($BEACHNOURISH == false)
and ($SEAWALL == false)>>You experienced
substantial shorefront erosion
<<elseif ($TURN > 0) and ($SEVEREWEATHER <= 2) and ($BEACHNOURISH ==
true) and $SEAWALL == false>><<set $B = 1>><span
class="positiveText">Beach nourishment prevented loss of sandy shore.
<<elseif ($TURN > 0) and ($SEVEREWEATHER > 2) and ($BEACHNOURISH
== true) and $SEAWALL == false>><<set $BEACHNOURISH to false>><span
class="negativeText">Severe erosion has depleted your beach.
<<elseif ($TURN > 0) and $SEAWALL == true>><<set $S = 1>><span
class="positiveText">The seawall has protected the area from major
erosion.<<elseif ($TURN > 0)>>Your forgot something.<<endif>>
<<if ($TURN > 0) and ($SEVEREWEATHER > 0) and ($RAISEROAD == true)>>
<<set $R = 1>>Your coastal road was
protected from storm surges and king tides.<<endif>>
<<if $TURN <= 5>>[[Make some decisions|Decisions]]<<else>>[[You've
reached the end of the game.|Summary]]<<endif>>
<<set $SEAWALLTEMP to false>>
Intro
Welcome to Adaptive Futures! In this game, you are a member of a
End
Thank you for playing! This project was funded by: <img
Install Seawall
Inform about Seawall Installation</spa <img
Beach Nourishment
Inform about Beach Nourishment</sp
Raise Road
Inform about Raising the Road /*
Do Nothing
Inform about Doing Nothing |"Description"|Do

NHRP Serious Games v0.4

Year: 2028
Budget: 200000
Score: 0

SAVES

RESTART

Status for 2028

In the last 10 years you experienced 2 years of severe weather.

You experienced substantial shorefront erosion

Make some decisions

Decisions

Over the next ten years, which of these strategies (if any) will you employ to address the concerns of the stakeholders?

- ☐ Install Seawall for $ 50000
- ☐ Beach Nourishment for $ 10000

Cannot afford to raise roads

Back to status page or see what happens in the next 10 years...

Information about Seawall Installation

Description	Sea wall (rock revetment)
Details	This sea wall designed to protect again erosion and storms to x. it will run the length of the beach and look like a sloped surface covered with large rocks.
Advantages	Seawalls stop erosion of the beach and the land behind the beach immediately. They protect all the properties business and infrastructure (roads etc) behind the wall.
Potential Issues	It is important to note that sea walls impact the width and appearance of the beach. There will be no high tide beach and at low tide the beach will be narrower have a flat profile and remain damp (no dry sand). Beach amenity and use for locals and visitors are lost in favour of protecting homes, businesses community assets and infrastructure (roads drains etc) and parks. It is important to note that sea walls have design

Challenges and upcoming work

- Representing science to enhance comprehension
- Reflecting future uncertainty and unpredictability
- Targeting games for particular audiences
- Evaluating impacts

Questions?