

Using behavioral science to support south Florida water management

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South Florida

Water Sustainability & Climate Project

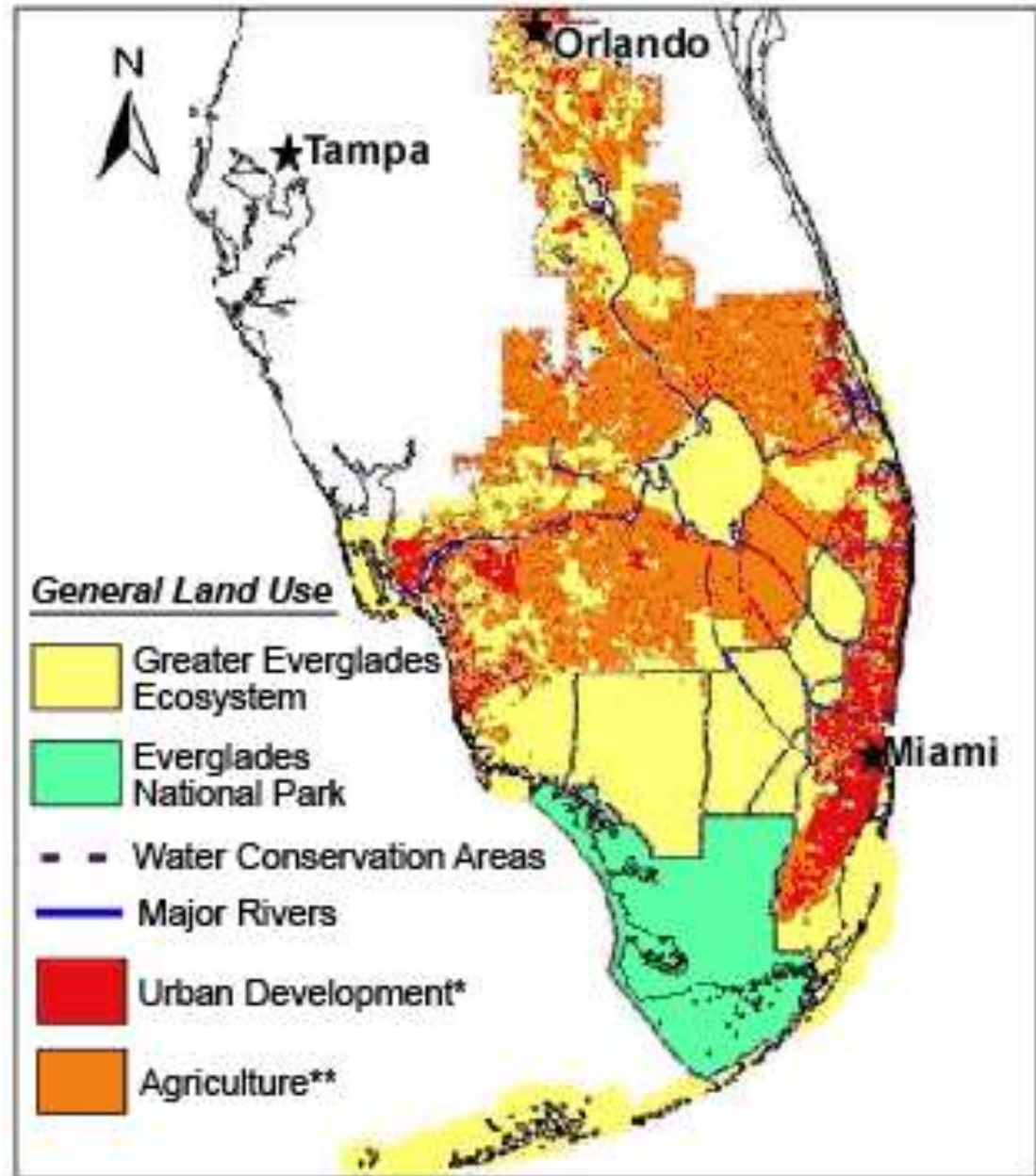
- 5-year, multi-institution, interdisciplinary project
 - Geologists, biologists, economists, climate scientists and behavioral scientists
- Focus
 - management of the Everglades watershed given climate impacts
- Goal
 - produce scientific models that balance social, economic, and ecosystem impacts



Study Area

South Florida Water
Management District
(SFWMD)

Comprehensive
Everglades Restoration
Project (CERP)



*Developed and **Agricultural areas include land use categories from the 1995 SFWMD land use GIS coverages.

Climate Impacts

- Sea Level Rise
- Changing precipitation patterns

Climate Impacts

- Consequences
 - Destabilize natural systems
 - Overwhelm human infrastructure
 - Change human behavior
- Response
 - Water management adaptation

Behavioral Team

- Can decision makers' cognitive models and behavioral biases be used to enhance the process of enacting resilient and sustainable regional water management plans?

Goals

1. Articulate barriers to the effective use of climate change predictions in the SFWMD watershed
1. Support decision making that prepares for (rather than responds to) climate change impacts

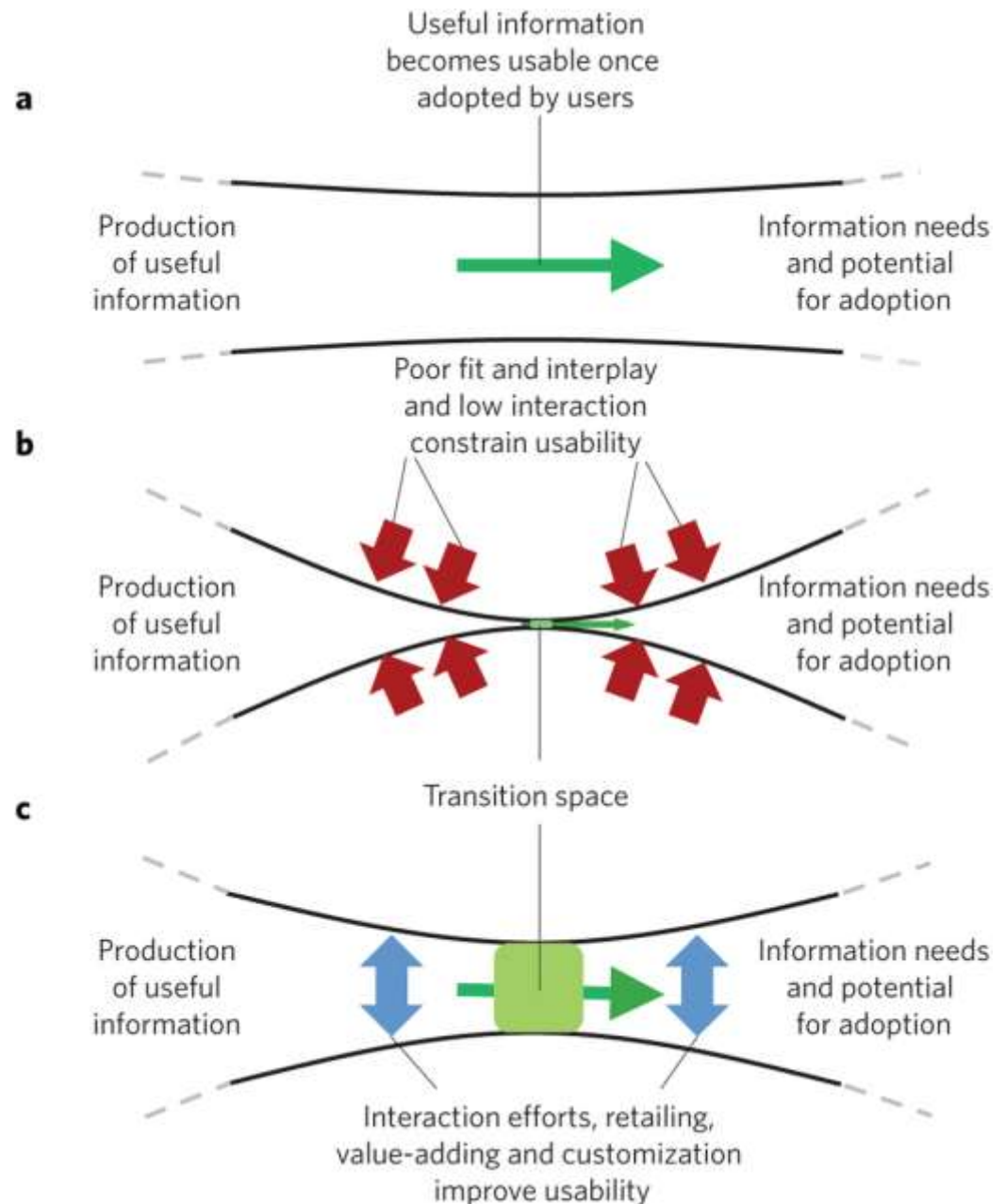
Climate Science Usability Gap

(Lemos et al. 2012)

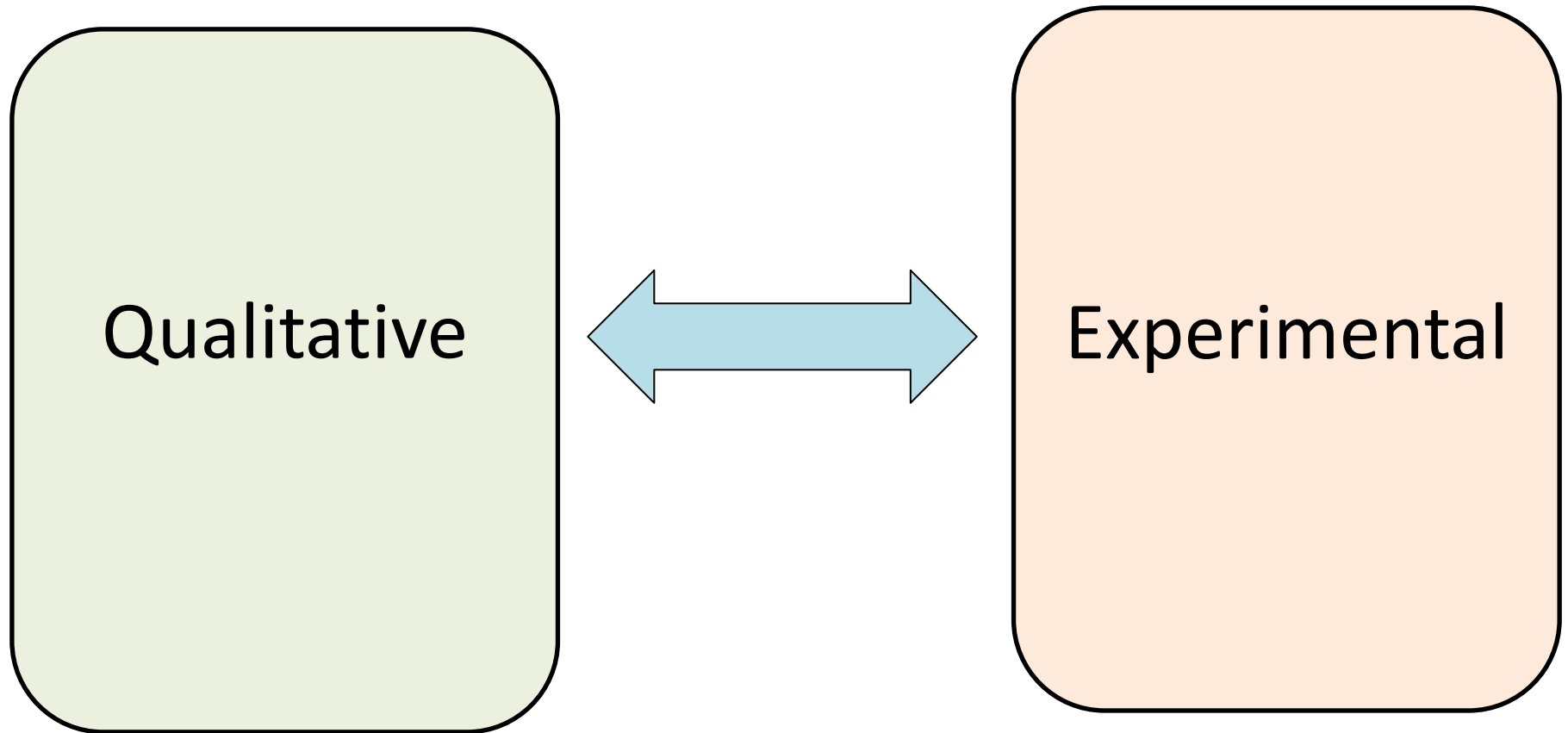
a. Idealized situation

b. Poor fit - observed

c. Co-production and tailored information



Two pronged approach



Planning for the future

- When and where will people live as sea level rises?
- What infrastructure should I build?

People can't just tell us -> experiments

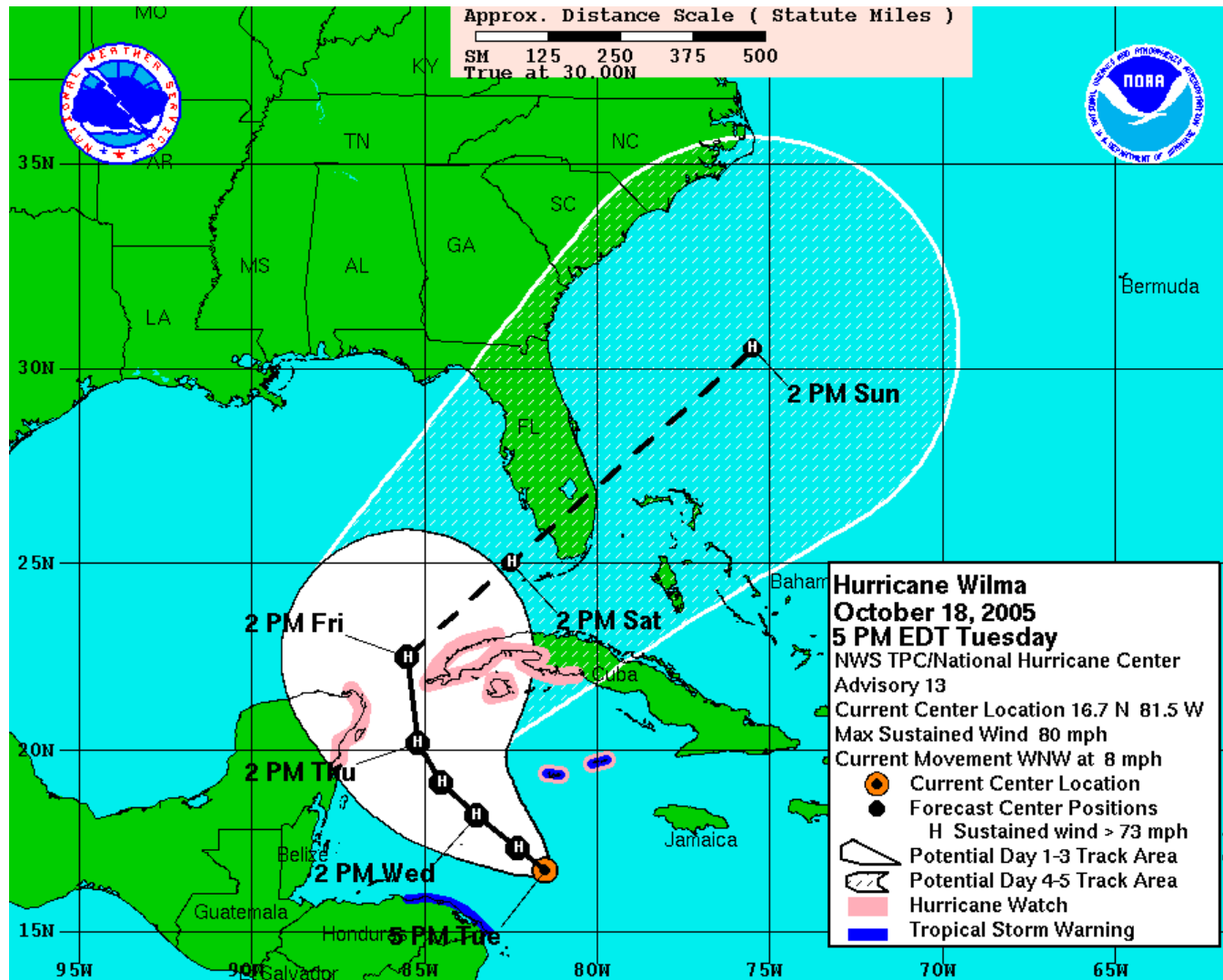
- Social effects
- Ambiguity aversion
- Status quo biases
 - Information search
 - News media
- Affective forecasting bias

Solution: put them in the future!

HazSim – virtual living room



Stormview: cone of uncertainty



GOODBYE, MIAMI

By century's end, rising sea levels will turn the nation's subtropical urban fantasyland into an American Atlantis. But long before the city is completely underwater, chaos will begin

BY JEFF GOODELL

BEFORE THE FLOOD

Miami is currently unprepared to adapt to even six inches of sea-level rise — half of what's predicted in as short a time frame as 20 years.

Experimental question

- How will Miami Beach residents make housing decisions 15 years from now given marked increases in SLR-related flooding?

Biases studied

- Information source weighting
 - What information sources are most influential?
- Ambiguity aversion
 - What happens as impacts becomes less ambiguous?

Experimental design

- 3 sources
 - TV
 - Neighbors
 - Web
- 3 time periods
 - 2016
 - 2023
 - 2030
- 4 messages
 - Price collapse
 - Insurance unavailable
 - Mortgages unavailable
 - Cost of living spike
- 2 levels of ambiguity
 - Low
 - High

Three conditions

	Ambiguity Level		
2016	High	High	High
2023	Low	High	High
2030	Low	Low	High

Dependent Variables

- Information search
- Worry about flooding
- Willingness to move/sell home

Independent variables

- Level of ambiguity
- Time period (year)
- Demographics
 - Mturk sample
 - Miami Beach residents

Anticipated findings

- Social information is more influential than scientific information
- As the ambiguity of sea level rise impacts decreases people are more likely to use scientific information

Miami Beach – low tide



Miami Beach – high tide



The Virtual Living Room

Click on the sources of information that you would naturally use to learn about the latest on the storm.



8am Sept 29



TV



James Murley
SOUTH FLORIDA REGIONAL PLANNING COUNCIL

CNN

Neighbors



MIAMI TODAY

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ENERGY & ENVIRONMENT

**Green business OKs can trigger
\$1 million rebate bonanza, pg. 16**

**Transit steps on gas in its drive
to link rail, new ballpark, pg. 17**



Miami Beach businesses ready for seasonal flooding

By Vance Holiday

Seasonal tidal flooding, once a rare inconvenience is now so predictable that businesses on Alton Road on Miami Beach stock sandbags just inside their front doors, ready anytime.

"It's really easy to see during our spring high tides that the sea level is coming up — for whatever reason — and we have to deal with that," said Jose Montero, the facilities manager for Whole Foods on Miami Beach. "We're ready for the water, and our doors will be open even if the parking lot is wet."

After weathering two years of construction while Alton Road was rebuilt at a cost of \$32 million, businesses have been enjoying the return of normal traffic and shoppers. "This is the best quarter we've had in years," Jimmy Carey of Jimmy's Kitchen told us. "It will be interesting to see what happens with the high tides this weekend. The locals brave the water, hopefully the tourists will too. We'll be serving up a salt water special — spicy seafood stew."

Members of the local Miami Beach business leadership council recently returned from a second fact finding trip to the Netherlands where they saw how the Dutch deal with tidal flooding first hand. "It was a real eye opener. We've all been talking about opportunities for making the beach more attractive and more resilient," said 29-year resident and architect for EFI Industries Prince Colon.

Retail roars back to fill storefronts

By Scott Blake

The City of Miami Beach wants to get serious about transforming its famed convention center and surroundings to keep up with the competition for large conventions and tradeshows — a key part of the Beach's economy.

Officials this week requested qualifications for "master developers" to partner with the city to create a "Miami Beach Convention Center District." It would feature a bigger and better convention center, and perhaps a new entertainment venue to replace the famed Jackie Gleason/Filmore Theater.

Also proposed for the 52 acres are restaurants, a hotel, retail and residential uses, and new parking sites. In addition to the convention center and theater, the redevelopment area includes Miami Beach City Hall and a 1,450-space garage.

"Years from now, we'll look back and relish in knowing that we had a part in building upon our great city's successes for future generations," Miami Beach City Manager Jorge Gonzalez said in a statement. "As they say, 'Miami Beach is

Mayors and feds continue legal standoff

Questions

Your thoughts on sea level rise in Miami Beach - 2016

How worried are you about the threat posed by sea level rise?

☐ ☐
Not at All Worried

☐ ☐ ☐
Somewhat Worried

☐ ☐
Extremely Worried

How seriously would you consider selling your residence and moving out of south Florida because of the threat of sea level rise?

☐ ☐
Not Seriously

☐ ☐ ☐
Somewhat Seriously

☐ ☐
Extremely Seriously

Back

Submit

Future Studies

Qualitative

- Survey of information gatekeepers in south Florida water management

Experimental

- How do major storm events function as signals?
- Can HazSim be used to facilitate stakeholder group dialogue?

Thank you!



Thank you!

Advisors

- Dr. Kenneth Broad, UM
- Dr. Robert Meyer, UPenn
- Dr. Jessica Bolson, UPenn

WSC team leads

- Dr. Michael Sukop, FIU
- Dr. Vic Engel, USGS

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