



## DRIBS - PROJECT STRUCTURE

### PROPOSAL

2006-2010

#### Rationale

Identification of need for beach hazard research

#### Improve understanding of beach hazards

Scientific research – PhD & pilot study

#### Identify knowledge gaps

Need for specific rip current research

#### Impact plan

Targeted impact-lead research proposal developed through a working partnership

#### Impact plan re-evaluation

(involving key stakeholders, beach managers, lifeguards, trainers and researchers)

#### Data collection

#### Data analysis

#### Implementation & assessment

Impact plan & monitoring

### PROJECT

2010-2013

## RATIONALE

- Importance of rip current hazard for beach safety - recognised by coastal scientists and lifeguards
- Rips are major cause of beach drowning globally (> 80 % beach drowning in Australia and US)
  - >68 % of all RNLI environmentally caused incidents in UK
- Limited understanding of rips on high-energy large-tidal beaches
- Identified need to update rip safety message, lifeguard training and educational material across the UK
- Global strategy: collaboration with ongoing rip safety research worldwide
- Need for a scientific basis to decision making

## RIP CURRENTS

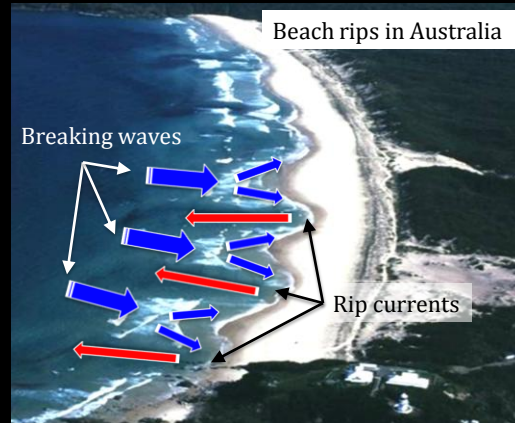
- Traditionally rip currents are known to be strong and narrow currents in the surf zone that extend seaward of the breaking waves and return water seaward that has been transported into the surf zone by breaking waves.
- Recently it has been identified that rip flow circulation is much more complex with many rip configurations forced by a variety of mechanisms on a range of timescales.

Typical measured rip flows:

mean flow =  $0 - 1 \text{ ms}^{-1}$   
max flow =  $1 - 2 \text{ ms}^{-1}$

Mega-rip flows (Short, 1999):

mean flow  $> 2 \text{ ms}^{-1}$



## RIP CURRENTS - TYPES

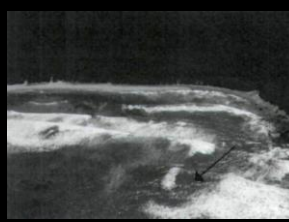
### BEACH RIPS (FIXED RIPS)

(CONTROLLED BY  
SANDBARS)



### TOPOGRAPHIC RIPS (PERMANENT RIPS)

(STRUCTURALLY/  
GEOLOGICALLY CONTROLLED)



### TRANSIENT RIPS (FLASH RIPS)

(WAVE-WAVE INTERACTION)



## UK RIP CURRENTS



## UK RIP CURRENTS

Rip hazards in the UK have been shown to be influenced by a range of factors

### UK RIP CURRENT HAZARD

>Annual

Seasonal  
(months - weeks)

Weekly  
(months - daily)

Daily  
(hours - minutes)

**BEACH TYPE**  
*(intermediate  
bar/rip  
beaches)*

**BEACH SHAPE/  
MORPHOLOGY**  
*(beach / sandbar  
change)*  
**WAVE CLIMATE**  
*(summer/winter)*

**TIDE RANGE**  
*(spings/neaps)*  
**WAVES**  
*(swell events)*

**TIDAL SWEEP**  
*(daily tides)*  
**WAVES**  
*(sets or groups)*

## KNOWLEDGE GAPS

### SCIENTIFIC

- Understanding rip current flow **circulation patterns**
- Understanding rip flow characteristics under a wide **range of wave, tide and sandbar conditions**. All three factors vary over time and even subtle changes in any of them may have significant repercussions for the rip circulation.
- Development of useful **rip current prediction tools** (assimilated numerical models)

### BEACH SAFETY

- Knowledge gaps were assessed through the development of a comprehensive **impact plan**
- Impact plan focussed on three key areas
  - Lifeguard training
  - Public education
  - Risk assessment

## IMPACT PLAN

### LIFEGUARD TRAINING / PUBLIC EDUCATION / RISK ASSESSMENT

A number of key knowledge gaps were identified:

- **Pre-arrival education** identified by lifeguards as key knowledge gap
- **Theoretical understanding** of beach processes and rip currents across the UK lifeguard community
- **Theoretical rip current** lifeguard training should be combined with **practical rip current experience**
- **Improving rip understanding** of lifeguards will improve the **communication** of rip current awareness to the public through RNLI **public education** programs
- **Presently there are no formal rip prediction tools** available beyond lifeguard personal experience. Something the lifeguards would welcome

## IMPACT PLAN

### KNOWLEDGE TRANSFER TO IMPROVE BEACH SAFETY – KEY OBJECTIVES

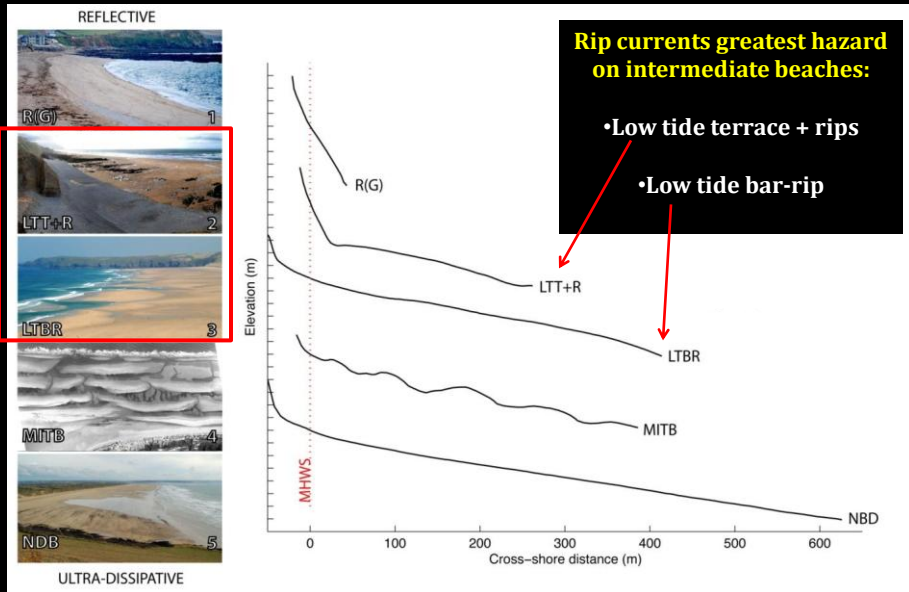
- **RNLI Rip Manual (2012/13):**  
The development and publication of a national standard rip reference document. An up-to-date rip current information resource for beach safety applications.
  - Lifeguard training
  - Public education
- **Series of workshops, seminars and public lectures (2012/13):**  
Communication of research findings to lifeguards and the general public.
- **Risk assessment tools (2012/13):**  
Development of a suite of rip forecast tools to enable both the public and lifeguards to make more informed beach safety decisions.
  - Simple rip risk calculator (5-day forecast) for lifeguard operations
  - Comprehensive single site rip prediction model

## DATA COLLECTION & ANALYSIS: RIP EXPERIMENT

### PERRANPORTH BEACH, SPRING & AUTUMN 2011




## RIP EXPERIMENT - BEACH TYPE




## RIP EXPERIMENT- MORPHOLOGY


### SEASONAL VARIATION IN SANDBAR SHAPE



Video cameras (every 30 mins)


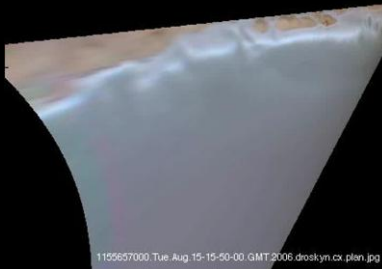


PWC bathymetric survey (monthly)



ATV topographic survey (monthly)

2006 - Present

# RIP EXPERIMENT- MORPHOLOGY

## SEASONAL VARIATION IN SANDBAR SHAPE



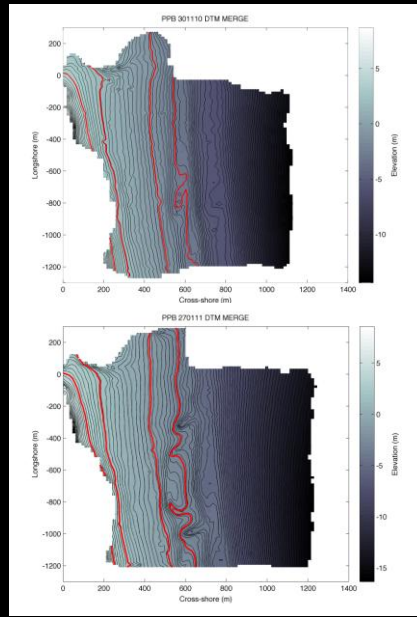
Video cameras  
(every 30 mins)



PWC  
bathymetric  
survey  
(monthly)



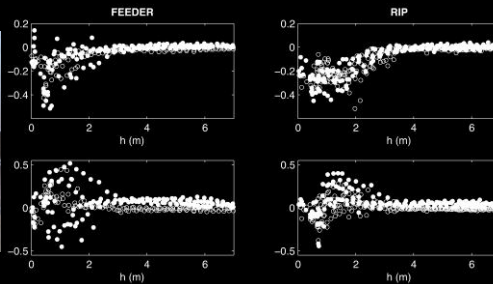
ATV topographic  
survey  
(monthly)



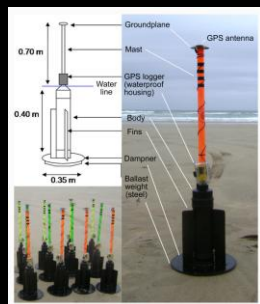
# RIP EXPERIMENT- WAVES, TIDES & CURRENTS

## SEASONAL FIELD EXPERIMENTS (2 x 6 weeks)

**RIP FLOW**  
Current meters  
+ tide / wave  
recorders



**RIP CIRCULATION**  
GPS tracked rip  
current drifters



## DRIBS PROJECT - SUMMARY

- 3-year RNLI/University of Plymouth partnership project
- Scientific research and operational impact
- Project developed through previous successful collaborations
- Partnership mutually beneficial
  - RNLI providing field support, and input on dissemination strategies
  - Research findings will be incorporated into RNLI lifeguard training, public education programs, risk assessment procedures and resource management tools
- Example of how impact-lead, academic research can provide ground-breaking science and save lives through a well structured working partnership.

## QUESTIONS?



Low-tide rips: Perranporth, Cornwall