Conservation and management: Telemetry and North Atlantic right whales

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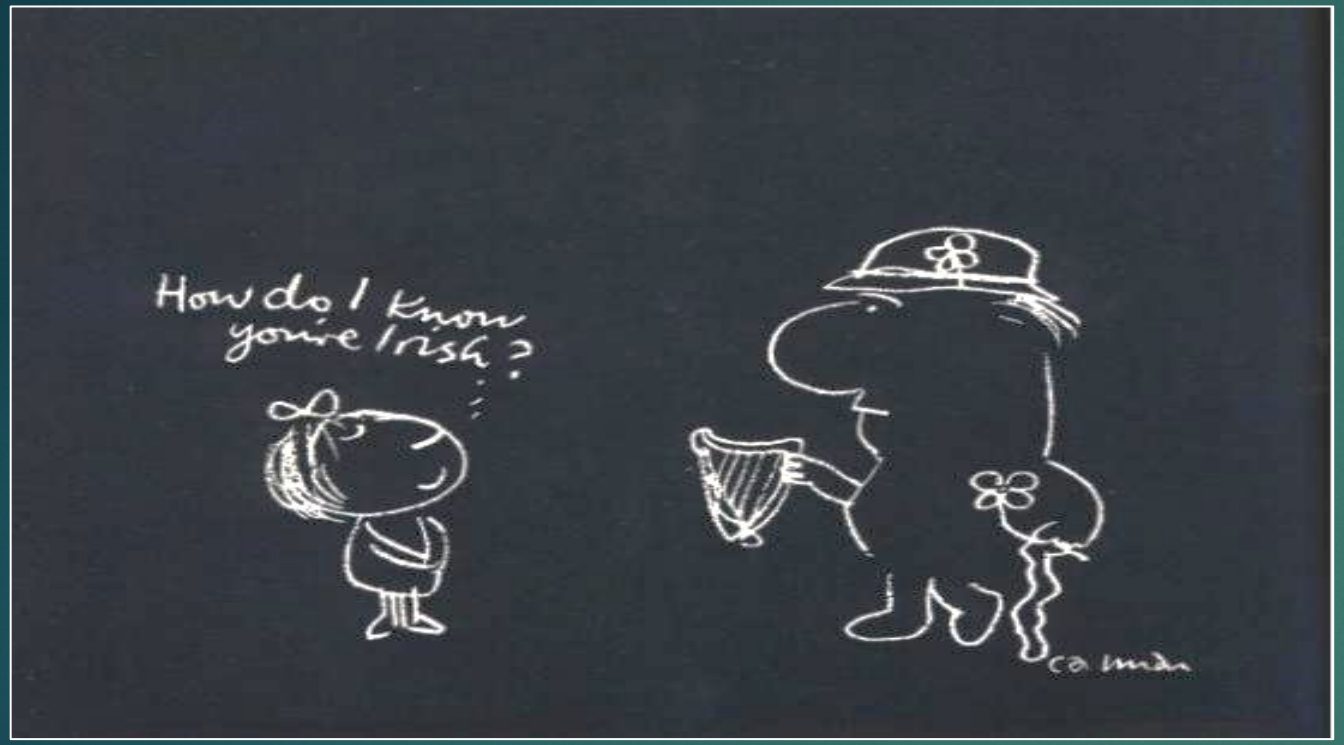
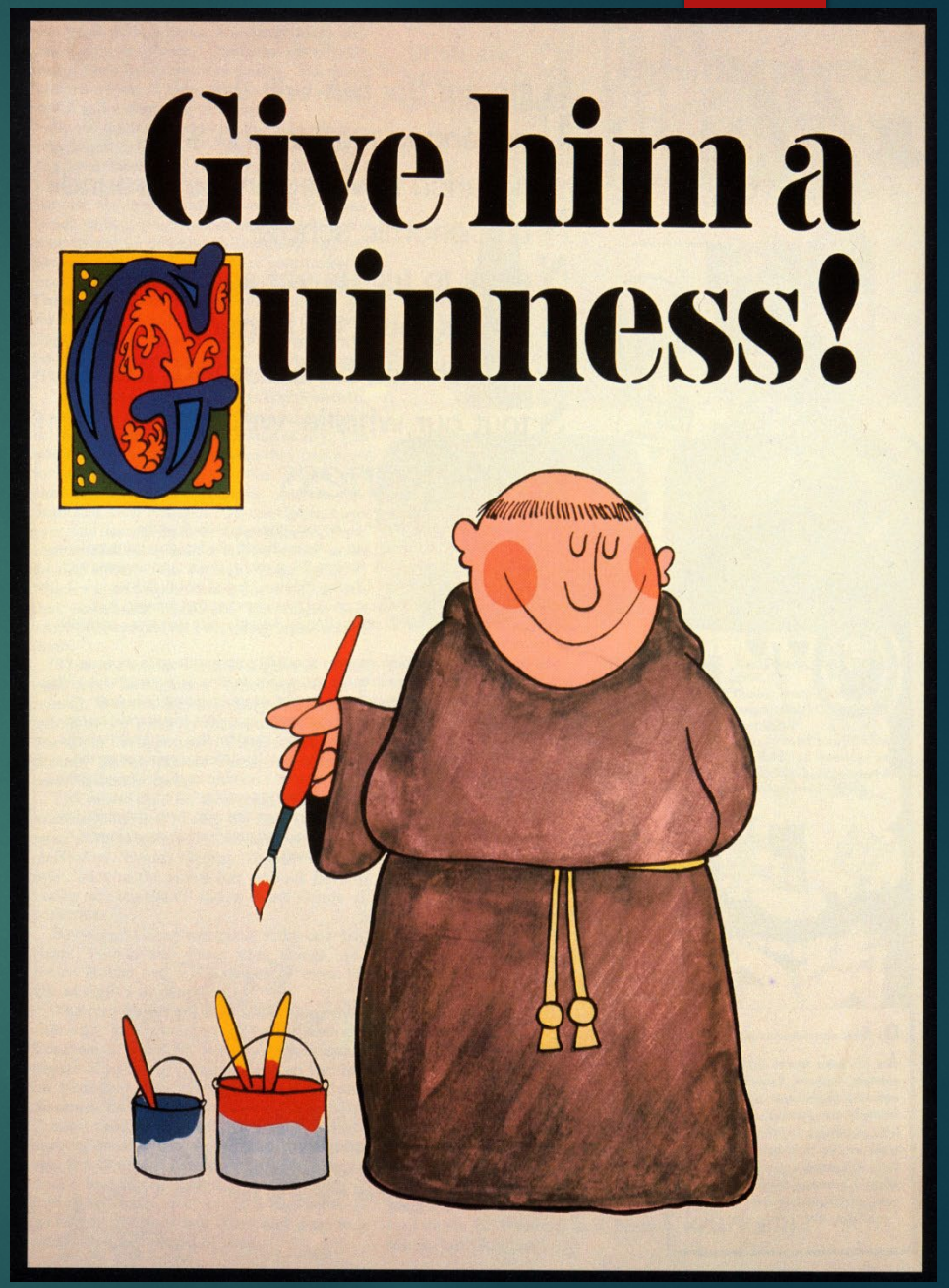

How do I know you're Irish?


Give him a Guinness!

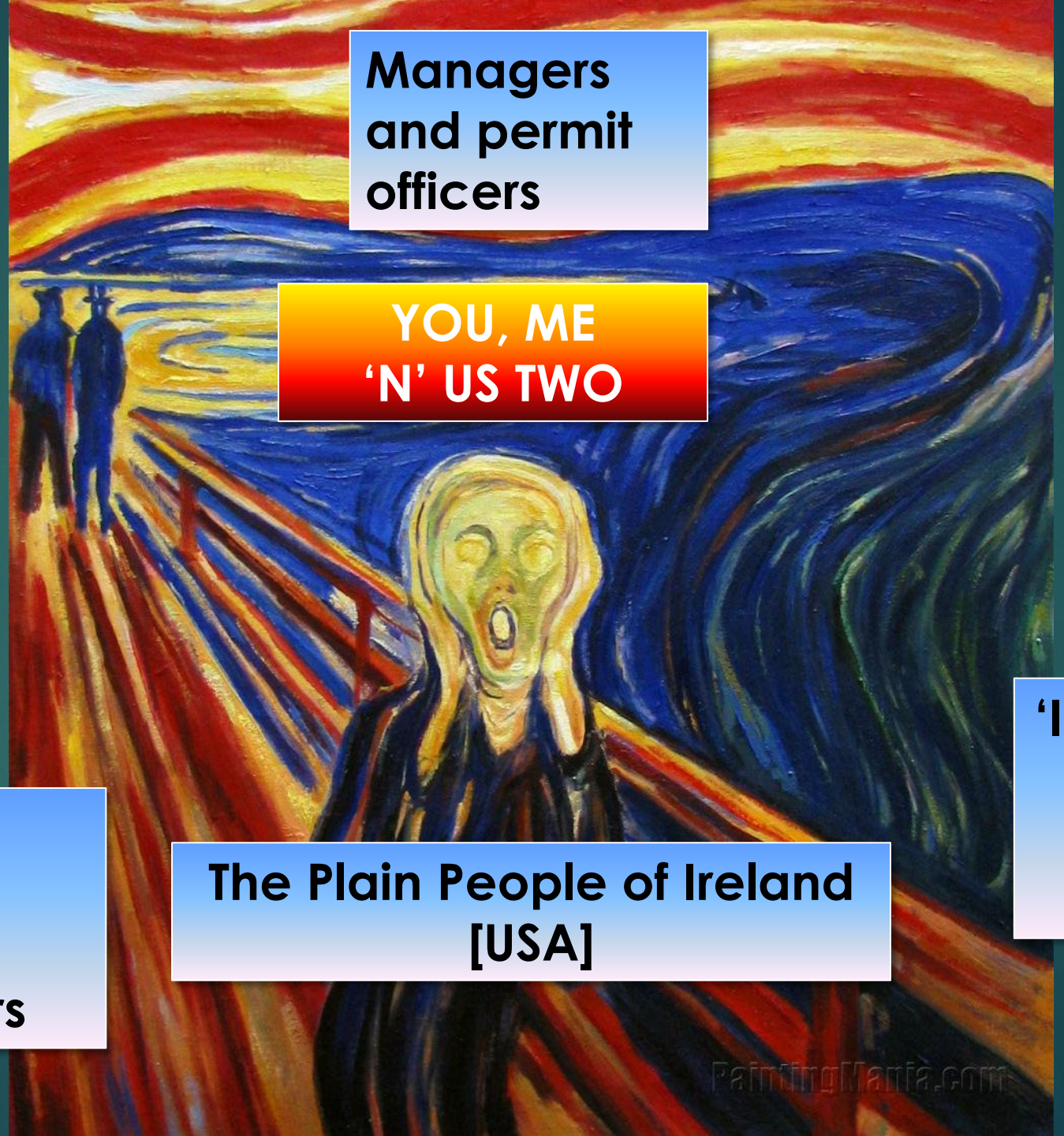
North Atlantic right whales

North Atlantic right whales

- Critically endangered
- Probably fewer than 350 (70 breeding females) remain; declining since 2010
- Slow dynamics
- Direct & indirect threats: entanglements, ship strikes, habitat degradation and change
- UME since 2017 – 70 detected deaths/serious injuries - many undetected
- Decline despite management-related actions including (source NOAA):
  - Protecting habitat and designating critical habitat
  - Rescuing entangled right whales
  - Reducing the threat of vessel collisions
  - Reducing injury and mortality by fishing gear
  - Minimizing the effects of vessel disturbance and noise
- Mitigation must be improved if population to survive

Conservation science

- Scientific work aimed at improving/ maintaining the status of populations – but individuals count
- Informs management actions – doesn't determine them – that is a societal/permitting issue
- Stating the obvious…
  - We cannot manage cetaceans only humans (and even then with difficulty)
  - There is no absolute agreed value system and many 'stakeholders'
  - Agree conservation and user objectives (society with scientific input)
  - We can/will get things wrong – monitor even if we think a problem is solved – especially in a changing world



Other scientists

Managers and permit officers

Funders

YOU, ME 'N' US TWO

Legislators

Other conservation scientists

Lawyers

'Users'
Hunters
Fishermen
Whalewatchers

The Plain People of Ireland [USA]

'Interest groups'
NGOs
Residents
Shareholders

Data needs for management

- What we know now vs what we need to know:
  - Information gaps & uncertainty with respect to cetaceans, human activities and their environment
- Question driven – **not** technique driven – strengths and weaknesses of all approaches
  - WHAT (is the problem)?
  - WHO (are the actors)?
  - HOW MANY (are there)?
  - WHERE (are the actors)?
  - WHEN (are they there)?
  - WHY (are they there)?
  - HOW (can we mitigate if there is a problem)?
- Cumulative effects
- Agree short- and long-term objectives **and monitor**

Many approaches – all with assumptions, imperfections and uncertainty

- Photo-identification – abundance (mark-recapture with assumptions), life-history, movements (with gaps), range….
- Systematic and 'opportunistic' visual/acoustic observations: occurrence, abundance, insights into range
- Strandings: mortality, cause of death, health
- Biopsy samples: stock structure, individual ID, health
- Habitat sampling
- Satellites: new insights into whales, more mature wrt aspects of habitat
- Telemetry: *continuous* movement at different scales, behaviour at various levels of detail depending on type
- INTEGRATION IS KEY

Telemetry is the focus here: WGW

- Similar situation in several respects
- Critically endangered (at that time ca 130 individuals)
- Feeding/calving grounds off Sakahlin Island known – not breeding grounds
- Potential population level effects of oil & gas industry in damage to prey: quality, quantity; acoustic disturbance, damage to habitat
- Known deaths due to entanglements and ship strikes
- Good information from especially photo-identification
- Telemetry proposed -

Trade-offs

Population benefits

Risk to Individual

Decision process for WGW

In principle:
Weigh up overall 'benefits' against 'costs'

Are the benefits sufficient (Ethics)?

Model population with potential effects/benefits

Complex - Ultimately may be a value judgement? **DISCUSS WITH RESPECT**

IF 'YES' …. Minimise risk
IF NOT……Stop

Practicalities given objectives

(1) Tag type options
(2) 'Delivery' options
(3) Area and time
(4) Sample size
(5) Tagging protocol
(6) Follow-up studies

Phased approach:

(1) Feasibility study?
(2) Review results
(3) New/revised priorities
(4) Focussed further studies

Some potential benefits to consider

- Geographical and temporal movement info critical to effective mitigation measures:
  - continuous movement paths vs snapshots
  - integrated studies using all available data
- Habitat information
  - Why animals are where they are when they are
  - model movements and distribution with respect to habitat variables – predictions in light of environmental change
  - integrated studies using all available data
- Mitigation information – behavioural understanding of responses to threats to assist in mitigation measure designs
- Improve population dynamics modelling (e.g. with respect to mark-recapture assumptions) to understand status and efficacy of mitigation measures

Some potential negative issues to consider

- Effects on individuals that may have population-level consequence with respect to survival and/or reproduction
  - As was the case for WGW, review not only of the target species but all large whales
  - Use the information to examine this in a population modelling context allowing for uncertainty
- Animal welfare issues: no researcher wishes to inflict pain
- Will the data really improve management and mitigation?
- Limitations of sample size – not practical to tag all animals
- Cost-benefit versus other approaches

What if it is decided to proceed in principle?

- Compare available tags (in light of objectives):
  - data requirements
  - longevity;
  - attachment mechanism; deployment method (vessel type);
  - cost; availability
- Experienced personnel essential
- Develop….

What if it is decided to proceed in principle?

- Detailed tagging protocol
  - Area/time
  - 'Candidates' (e.g. sex, age class, body condition)
  - Approaches: method/number
  - Data collection:
    - Biopsy sampling; photo-id;
    - Behavioural responses to tagging (video)
    - Position/depth
- Follow-up studies
- Prompt analysis of data

I'm still listening, Grandad

Conclusions

- Our task over the workshop:
  - Provide up-to-date **scientific** information to decision makers on the potential use of telemetry studies (in conjunction with other techniques) in the conservation and management of large whales with a focus on application to the western North Atlantic right whales
  - This includes addressing potential and actual benefits and risks and recognising inevitable scientific uncertainty
  - The workshop does NOT make decisions but provides the experts present advice on those aspects of the issue for which it is competent.
- We all are trying to ensure the survival and improved status of western North Atlantic right whales – it's complex and urgent
- We need to listen to all ideas with respect – and focus on our own areas of expertise

Go raibh maith agat – thanks for listening

- Thanks are due to the huge number of people who have inspired and challenged me over the years on conservation science and management issues – way too many to mention individually but many of whom are in this room actually or virtually
- I would especially like to thank two US colleagues and friends who have recently died: Mike Tillman and Craig George
- Most importantly of all, I continue to thank my darlin' late wife Jette Donovan Jensen without whose love and unconditional support over the decades I would not be here…