

Field surveying: Problems, pitfalls and solutions

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Some background

- My work is on inter-observer variation in habitat mapping
- Application of vegetation classification / mapping in environmental management and assessment
- Recently:
 - review of accumulated studies, and
 - questionnaire survey of professionals involved in habitat-level survey and assessment

Today

- What lessons can be learnt from habitat-level observer bias?
- Can training reduce bias?
- Is there a need (and demand) for accreditation of survey skills at habitat level?
- Is there a real problem?
- What should we do about it?

Variation at species level

- Observer variation is ubiquitous and largely unavoidable
- Not just species-id issues
- Causes
 - Survey effort (time, distance, number.....)
 - Time of year
 - Weather
 - Surveyor experience

Inter-observer variation in species-lists

Kirby *et al.* (1986) Seasonal and observer differences in vascular plant records from British woodland *Journal of Ecology*, **74**, 123-131.

Kirby *et al.* (1986)

Three woods surveyed; plant species recorded in each using:

- two methods:
 - quadrats
 - walk-survey on fixed route
- two surveyors using each method
- three surveys by each surveyor within each of two dates:
 - spring
 - autumn

Results for **walk surveys** in Wytham Wood, Oxfordshire:

Observer	Season	Mean % species in common (range in brackets)	n
Same	Same	73.1 (60-80)	12
Different	Same	64.6 (53-76)	18
Same	Different	61.4 (53-70)	18
Different	Different	59.5 (51-65)	18



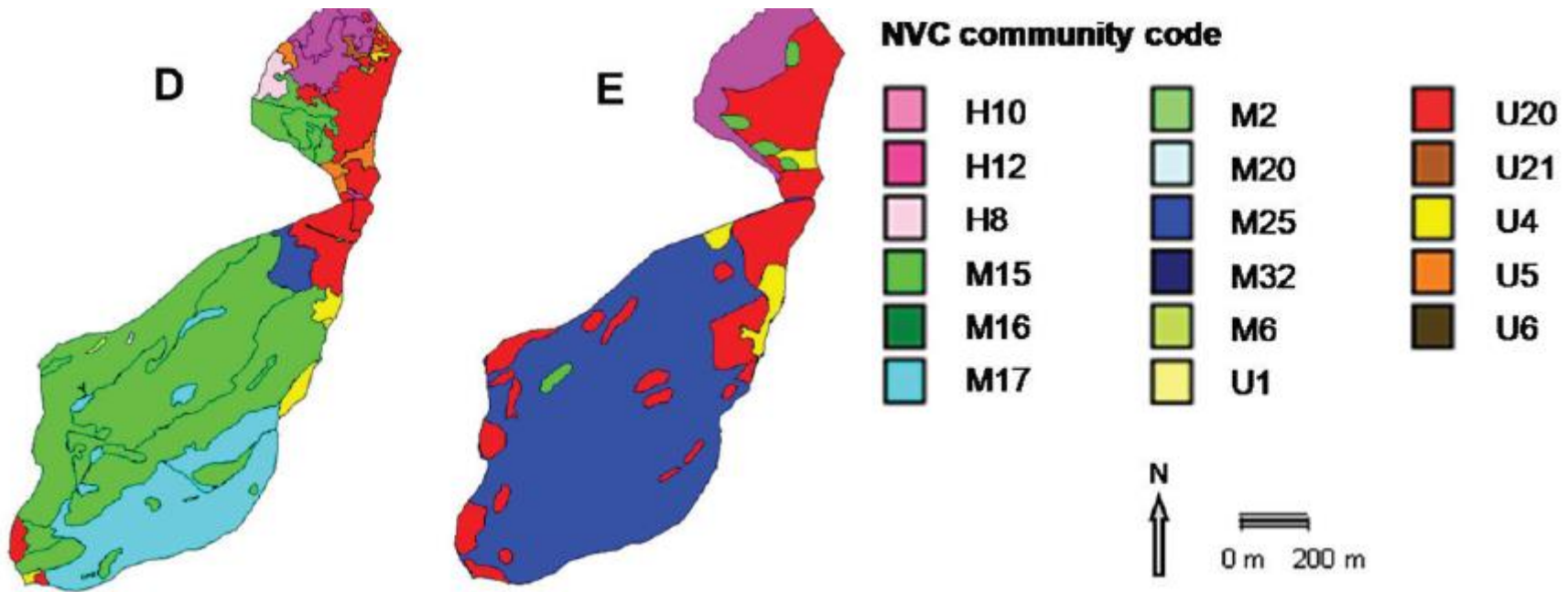
Variation at species level

- Observer variation is ubiquitous and largely unavoidable
- What are the consequences?
 - Species-level assessments
 - Site assessments
 - Monitoring
 - Identification of vegetation types

Identification of vegetation types

- It's difficult
 - ... very important
 -less studied
- species id skills
- plus expertise in:
 - methodology
 - management / environmental effects on veg
 - geographical variation

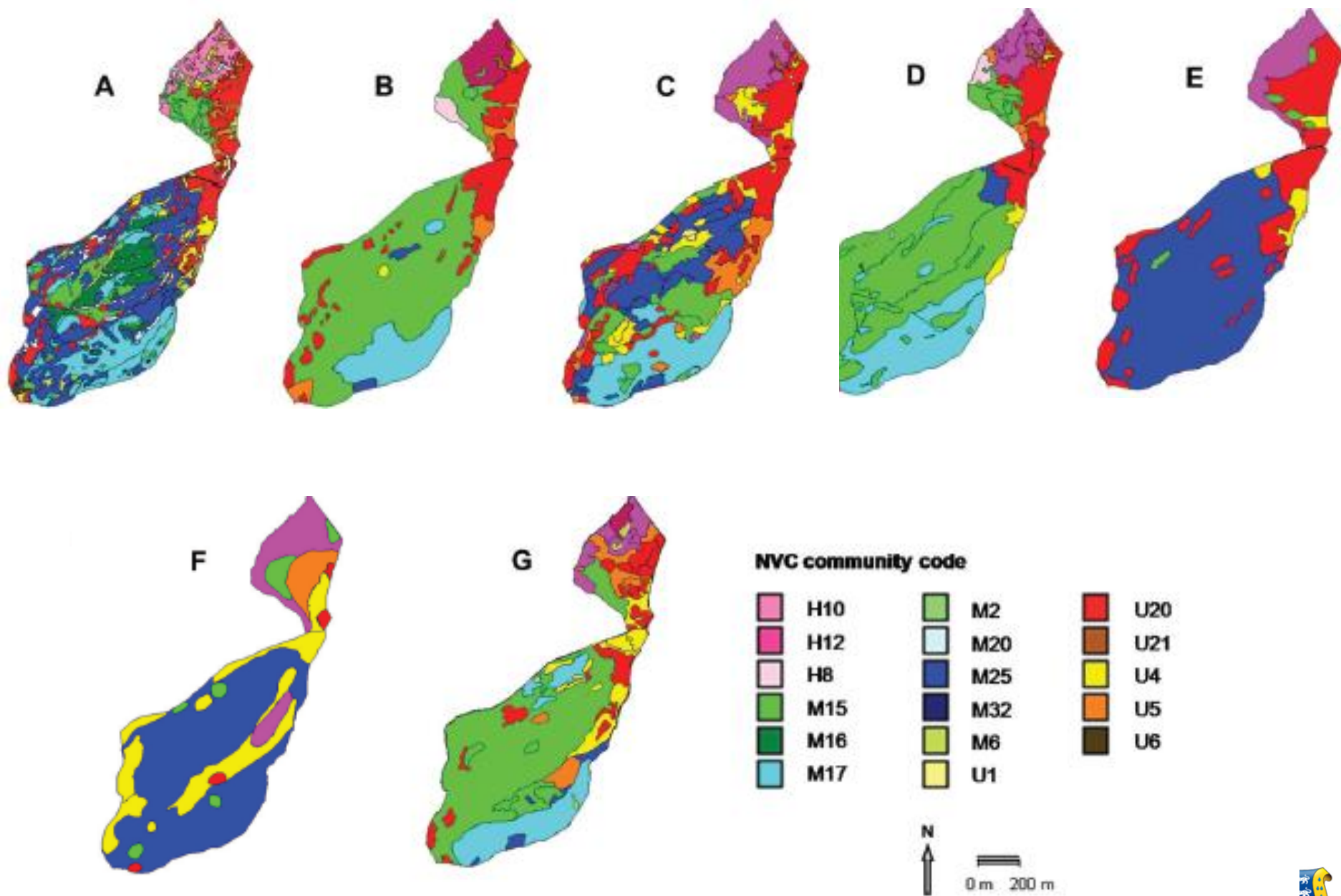
Observer effects in NVC survey



43 ha site

17% agreement by area

Hearn *et al.* 2011
J Environ Management

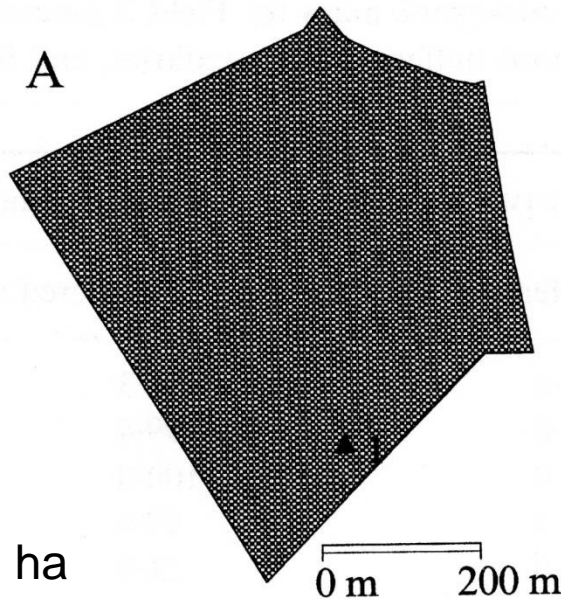


Mean agreement = 34%

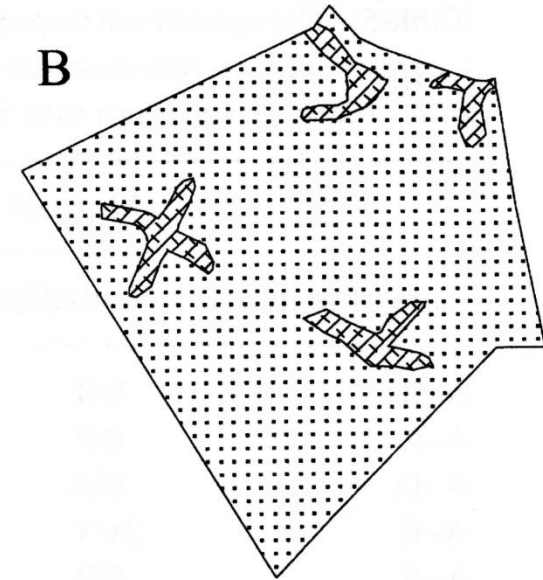
What do studies of inter-observer variation tell us?

- Inter-observer variation at habitat level is greater than at species-level
- Knowing weaknesses in your data is very important
 - Limitations to use of data
 - Reporting uncertainties
- It reveals areas of methodology and training that might be improved
- We need to know more about how surveyors behave in the field

Observer effects in Phase 1 survey



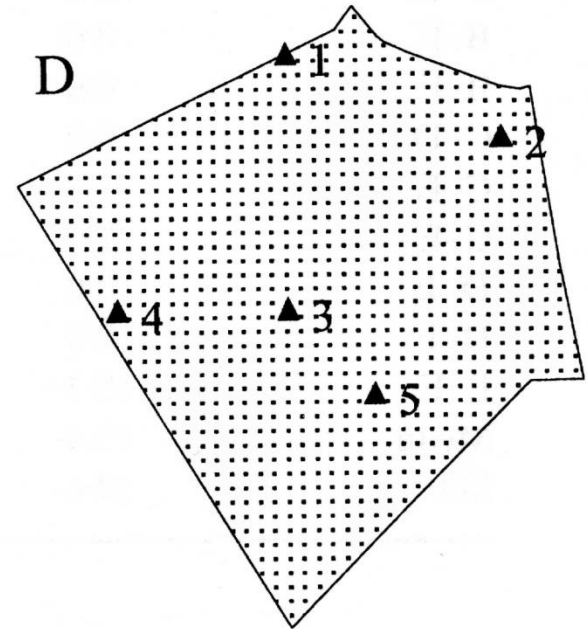
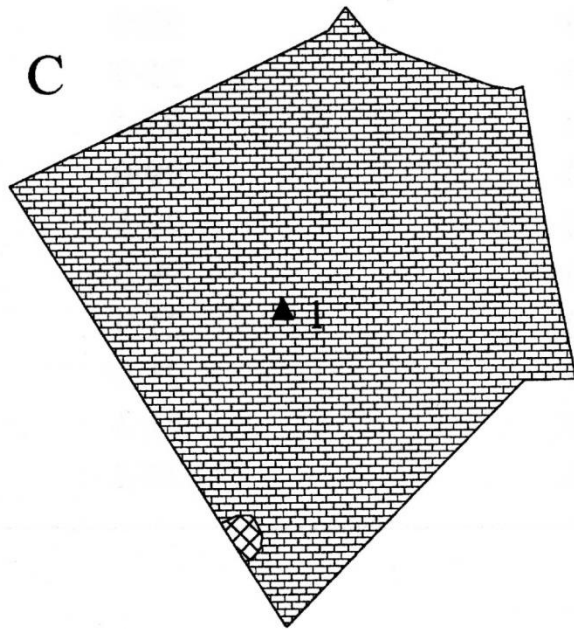
 Semi-improved acid grassland



 Semi-improved neutral grassland

 Acid/neutral flush

Observer effects in Phase 1 survey



Semi-improved neutral grassland



Marshy grassland

Some lessons learnt

We need:

- More objective habitat definitions
- More consistent interpretation of definitions
- Better ‘sampling’ of in-field variation
- More consistent use of Target Notes to:
 - explain mapping decisions
 - aid site evaluation
- Better species id skills

Evidence for benefits of training

- Agreement (by area) between independent surveyors – without group training:
 - Phase 1 26% (range 17-39%) (n = 2 studies)
 - NVC 34% (range 5-70%) (n = 1)
- Agreement (by area) with group training:
 - Phase 1 _(CCW) >70% (n = 1 study)
 - NVC _(NWSS) >80% (n = 1)
 - CS _(ITE/CEH) >70% (n = 3)

See Cherrill 2013 *In Practice* for original sources

Training and accreditation

- Field habitat identification skills
 - species id, but a whole lot more
 - understanding of habitat types and their variety
 - survey methodology, sampling designs etc
 - adherence to data collection/reporting protocols
- A model exists for species-id level accreditation
 - BSBI Botanical Skills Pyramid
 - Field Identification Skills Certificate (FISC)

BSBI FISC skills pyramid

6. Excellent ID skills – likely to be commissioned nationally for surveying a particular group. Likely to publish. Would probably keep a reference collection.

Minimum level for teaching professional ID courses.

Would be expected to record at least 75% of their taxa within a site

5. Very good ID skills – in one group or more – more-or-less totally reliable for a site survey for that group – would expect to identify any rare species or hybrids or take vouchers for ID.

Would be expected to know about legislation and automatically have appropriate licence. Always uses scientific names

Minimum level for agency employee or consultant and for NVC. Minimum level for FSC associate tutor for non-credit teaching

4. Good ID skills in one group – could be commissioned to survey a site for vascular plants but may miss sub-species and hybrids. Reasonable on grasses, sedges and ferns. Member of relevant recording society. Should automatically submit records. Should use mostly scientific names.

Ideally, schemes and societies should aim for this as the minimum for active recorders and VC recorders

Minimum level for FSC tutor. Minimum level for a recorder to have their records accepted. Phase 1 survey level

3. Reasonable ID skills – some flowering plants, some common grasses, sedges or ferns – an improver. Should be aware of relevant national recording society. May be a member. May submit records locally. Uses common names usually.

Can include the 'village expert', and may lead informal walks

2. Some ID skills – can ID common flowering species, for example but not capable of producing a comprehensive site list. No grasses, sedges or ferns, but some rushes. May have attended on courses but not familiar with collecting and refereeing of voucher specimens. Unlikely to be a member of relevant recording society although may be a member of a local recording group. Uses common names.

1. Basic ID skills – can recognize a buttercup, daisy or plantain. No grasses, sedges or ferns. May not have attended any sort of training course in identification, but intends to work/record in that area. Usually not a member of BSBI. Probably unaware that they are at this level but would like to be at one of the above levels (often a recent undergraduate).

0. General populace with no current engagement in field botany

Do we need a “Field **Habitat Identification** Skills Certificate (FHSC)”?

- What should surveyors know?
- How should it be assessed?
- Who would develop it?
- Is there evidence that miss-id of habitats has serious consequences in professional practice?
- Is there demand for accreditation from industry?

Questionnaire survey of CIEEM members

SurveyMonkey - 157 responses
NVC and Phase 1

- What is the frequency of reports with miss-id of vegetation types?
- What were the consequences of errors?
- Is there demand for accreditation?

Perceived frequency of survey reports with errors

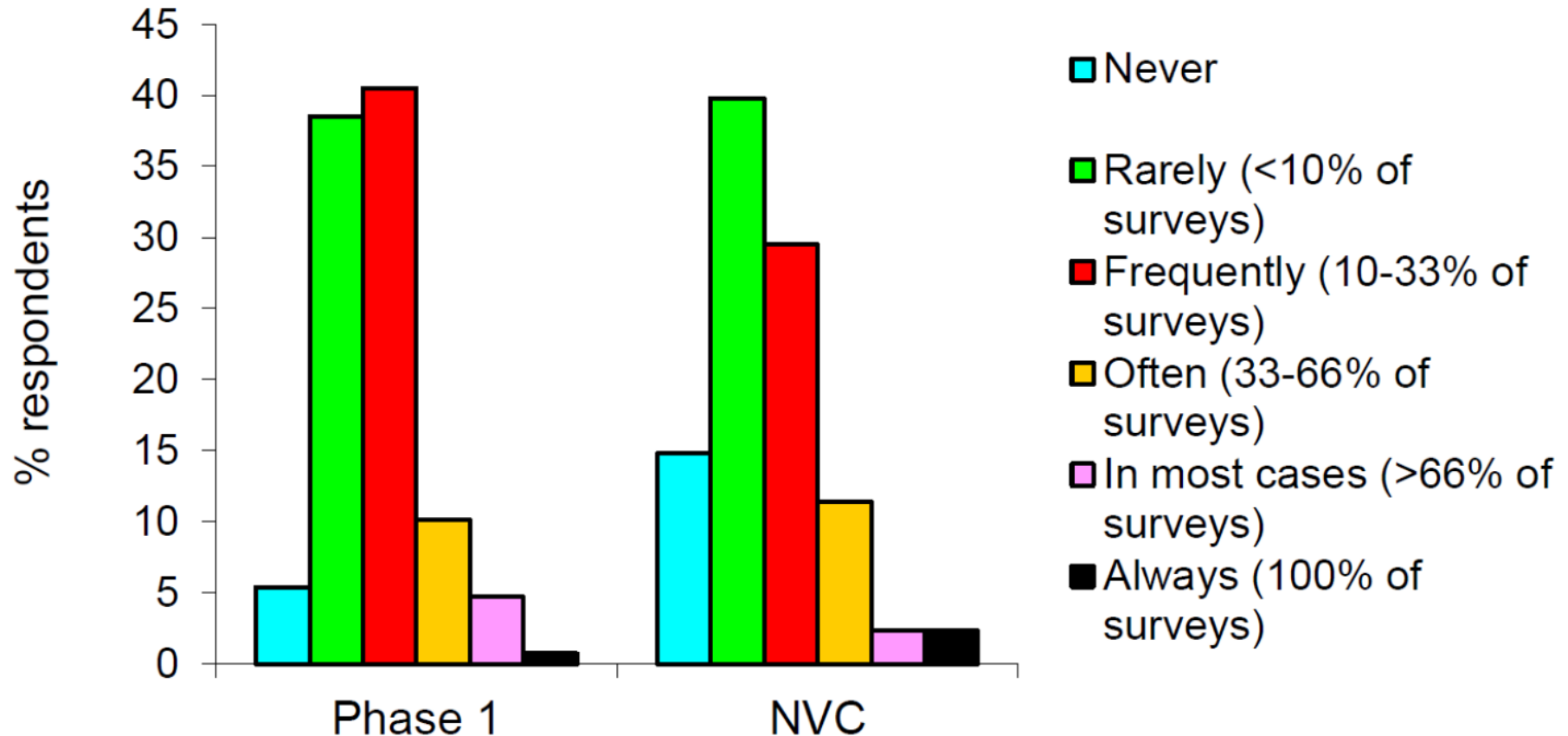


Figure 1. Respondents' perceptions of the frequency with which vegetation types were misidentified in surveys between 2009-2014 (Phase 1, n=148; NVC, n=88).

Frequency of perceived errors in habitat identification

- Phase 1 - 20% of survey reports
- NVC - 18% of survey reports
- (weighted averages.....)

Consequences of perceived errors

- Most frequent issue arising from miss-id of vegetation types was inaccurate ecological site evaluation:

Phase 1 - 41% of respondents

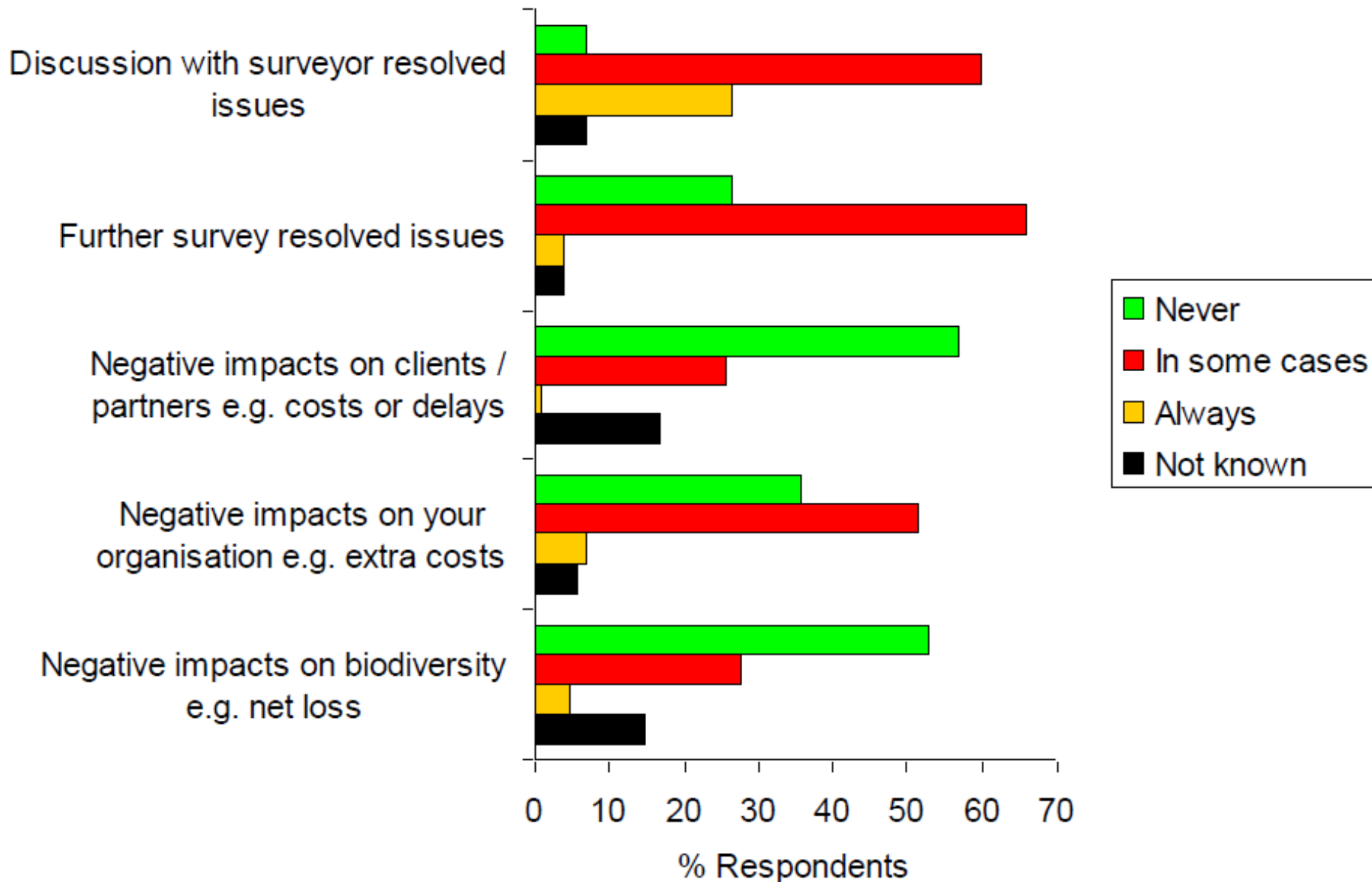
NVC - 43%

What were reports used for?

- Development-related site assessments (some formal EIAs)
- Input to Site Management Plans, monitoring, condition assessments etc.

What happened next?

(Phase 1, n=102)



Key points:

- For both Phase 1/NVC consequences are largely in terms of requirement for more:
 - Survey
 - Discussion
 - Time
 - Cost
- Rare cases of delays to projects, planning applications and avoidable biodiversity loss (probably ~10% of reports with errors)

- Support for accrediting skills in habitat survey among CIEEM members:

Phase 1	77% in favour	(n=110)
NVC	84% in favour	(n=77)

Do we need a “Field Habitat Identification Skills Certificate” (FHISC)?

Evidence:

- Support for an accreditation scheme
- Miss-id of habitats is more frequent than desirable
- There are (some) negative consequences
- Training can reduce inter-observer variation

What would a FHISC look like?:

- What should we know?
- How should it be assessed?
- Who would develop it?
- **Would it actually raise standards?**

Thanks

- You - for listening today
- Sarah Whild
- CIEEM and its members for supporting and taking part in the questionnaire survey