

# INVASIVE SPECIES SURVEY TECHNIQUES: PLANT SURVEY

Gillian Allard  
Forestry Officer (Protection and  
Health) and  
Beverly Moore, FAO Consultant

APFISN Workshop: Forest Health Technology & Phytosanitary Standards  
Beijing, China  
6, 8, 10-11 November 2011



## Introduction

- The longer a non-indigenous species goes undetected in a new area:
  - Less opportunity to intervene
  - Options for response become fewer & any intervention becomes more expensive and has less chance of success
- Prevention & early detection activities are vital in protecting forest environments from non-indigenous & possibly invasive species



## Invasive plant species management

### Four phases:

1. **Planning** – identifies land management goals (e.g. resource protection or conservation, production, etc.) & objectives
2. **Inventory/survey** – determines which species are present & their distribution
3. **Monitoring** – provides information on how species/populations change over time, their impacts on ecosystem & impact of management practices -also detects new invasive plant species/populations
4. **Management** – uses appropriate control methods (e.g. physical, chemical, silvicultural, biological) for eradication, suppression, containment, or restoration thereby reducing distribution & impact of invasive species

## Inventories and surveys



- Provides qualitative or quantitative information necessary for assessing & prioritizing invasive plant management efforts and improving cost effectiveness
- First step in managing invasive species is to know where they are and where they are not
- Assess the status of invasive plant populations (e.g. location, distribution, abundance)
- Identify areas free of invasive plants
- Detect new invasive plant species or populations

## Inventories and surveys

- Conducted for different purposes, use a wide range of methods, & vary in scales & level of detail (resolution)
- Detailed inventories/surveys can provide baseline data for developing monitoring programmes
- Quantifying invasive plant status in a management area can help justify funding or support other requests



## Survey vs Inventory

- **Survey** = sampling the landscape at various points
- **Inventory** = censusing the entire landscape



## For consideration before developing and carrying out surveys

- What is your objective?
- How will the data be used?
- What level of precision will be needed?
- What are your constraints?

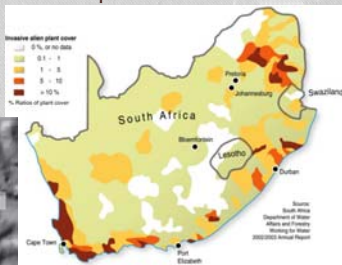
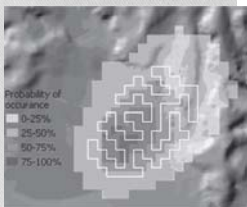
## Typical survey objectives

- Early detection of new invaders
- Locate maximum number of species
- Locate most populations of a single (known) species
- Gather landscape-level data



## Use of data

- Mapping – basic or more precise
- Modelling – to predict where species could occur in other landscapes



## Maps and Modelling

- Maps from inventory/survey data are valuable references that document plant populations and management activities
- Can be used in education and out reach efforts for the public, policy makers...
- Survey data should reflect the spatial distribution of the target species populations over the landscape
- Such data can then be used in combination with environmental data, to create probability maps of target species occurrence for the entire area of interest

## Level of Data Precision

- Determine scale – low resolution vs high resolution
- Will determine how you develop and carry out your survey
- NB More intensive surveys will be needed to provide high precision of data

## Constraints

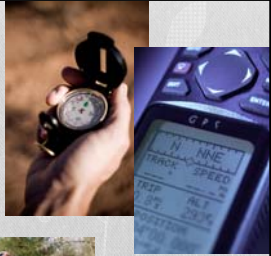
- Money
- Time
- Landscape type





## Constraints

- Survey technology – map & compass, basic/fancy GPS
- Transportation availability – helicopter/plane, by foot, 4WD, animal, bicycles



## Inventory/Survey categories

- Document distribution & abundance of invasive plant populations to make management decisions

➔ **Exploratory & Reconnaissance**

- Provide further understanding of invasive plant populations/communities

➔ **Extensive & Intensive**

## Choosing type of Survey

- Surveys can be carried out to determine if there are any invasive plants present or to determine the extent of an invasion by a known invader
- Choosing a survey type depends on the aims, objectives and financial aspects of the particular project

## Survey types

- **Exploratory**
  - Sparse information
  - Fast & efficient search
  - Create basic map
- **Reconnaissance**
  - Some info known
  - Detect new populations
  - Obtain more gross information
- **Extensive**
  - More detailed information
  - Identify correlations between landscape & weeds
- **Intensive**
  - Gather most information
  - Baseline for future monitoring
  - Understand ecology
  - Extrapolate data using modelling

## Survey methods

- Ground-based – by foot, animals (i.e. horses), bicycles, 4WD, etc.
- Aerial-based – helicopter, plane
- Remote platform



## Sampling methods



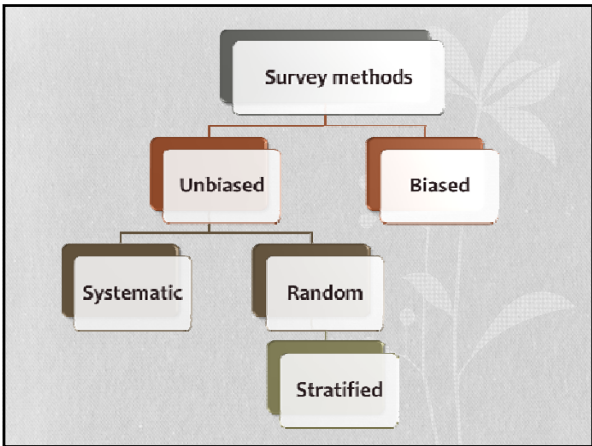
Point



Swath



Linear



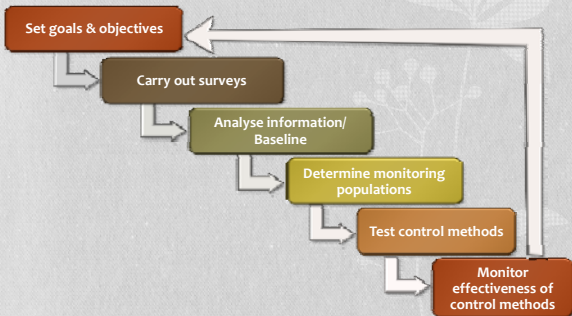
## Biased and unbiased surveys

- An example of a **biased survey method** is transect sampling along a chosen area (i.e. roadways, riparian areas) - appropriate when looking for specific species that you know grow in certain areas
- A good method for early detection of new (known) invaders and to find the most populations of a single species.
- **Unbiased survey methods**- good for understanding weed distribution across the landscape as most populations of a different species can be detected.
- Unbiased methods are further divided into systematic (grid sampling) and random (point, swath, stratified) methods.
- An example of a stratified method is survey of a line perpendicular to a road or trail, a targeted transect or contour transect.

## Data to collect

General	Plant	Environment
Name of examiner	Weed density	Disturbance
Date of survey	Weed percent cover	Habitat
Area surveyed	Weed status	Slope
Type of survey	Native species	Aspect
Plant name (Latin, common, code)		Elevation
Infested area (presence)		
Canopy cover of infestation		
Property ownership		
Source of data		
Hydrologic unit		
Location (lat/long, quad number & name)		

## Summary of the management process



## Community-based approach to natural resource challenges - Bushcare

- Establish baseline – identify what the issues are and develop a long-term plan
  - Break this down to an annual plan
  - Principle - start from the least affected area & work towards more affected
  - Allows work done to be matched to resources available & avoids having to redo work-
- move forwards with nothing to worry about behind you*

## Voluntary Bushcare in Brisbane, Australia







**THANK YOU!**

APFISN Workshop: Forest Health Technology & Phytosanitary Standards  
Beijing, China  
6, 8, 10-11 November 2011