Beyond the knowledge deficit model: Changing environmental behaviors

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20 September 2007
California Invasive Plant Council
San Diego, California

Behaviors worth changing	Population targeted
↑ Increase	
sales of invasive plants in nurseries	horticultural industry
gardening with invasive plants	gardeners
↓ Decrease	
volunteering to remove invasive plants	general public
funding to manage invasive plants	legislators

Behavior change literatures

conservation psychology

community-based social marketing

public health

behavioral economics

environmental education

interpretation

Testing the knowledge deficit model

Behavior will change
if people have the right information

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Testing the knowledge deficit model

Behavior will change
if people have the right information

Results

The model is quite prevalent among communicators and quite ineffective in changing behavior

SMOKING!

Promoting Persuasion in Protected Areas

A Guide for Managers

Developing strategic communication to influence visitor behaviour

Sam H Ham
Terry J Brown
Jim Curtis
Betty Weiler
Michael Hughes
Mark Poll

Alternatives to the knowledge deficit model

An introduction to persuasive communication theory (after Sam Ham et al. 2007)

Ajzen's Theory of Planned Behavior (TPB)

or

Petty & Cacciopo's Elaboration Likelihood Model of persuasion (ELM)

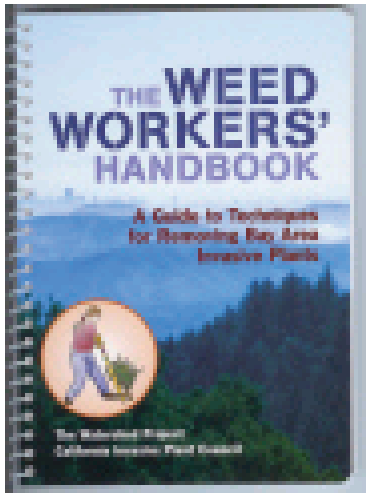
An alternative to the alternatives

The ABCs of interpretation

know your Audience

keep it Basic

remember the Context



Crafting better public outreach strategies and materials

Asha Setty & Mary Petrilli
Golden Gate National Parks Conservancy

10:30 AM, Ventana Room

An alternative to the alternatives

The ABCs of interpretation

know your Audience

keep it Basic

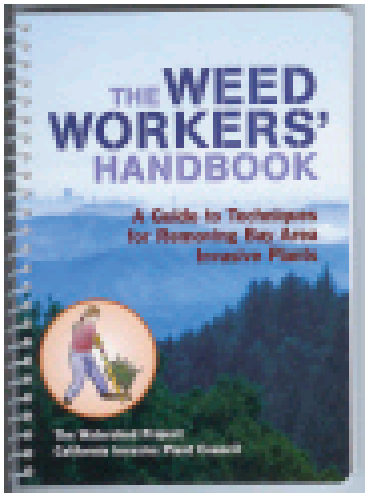
remember the Context

Incentives work

express Enthusiasm and Joy

Listen!

think Strategically

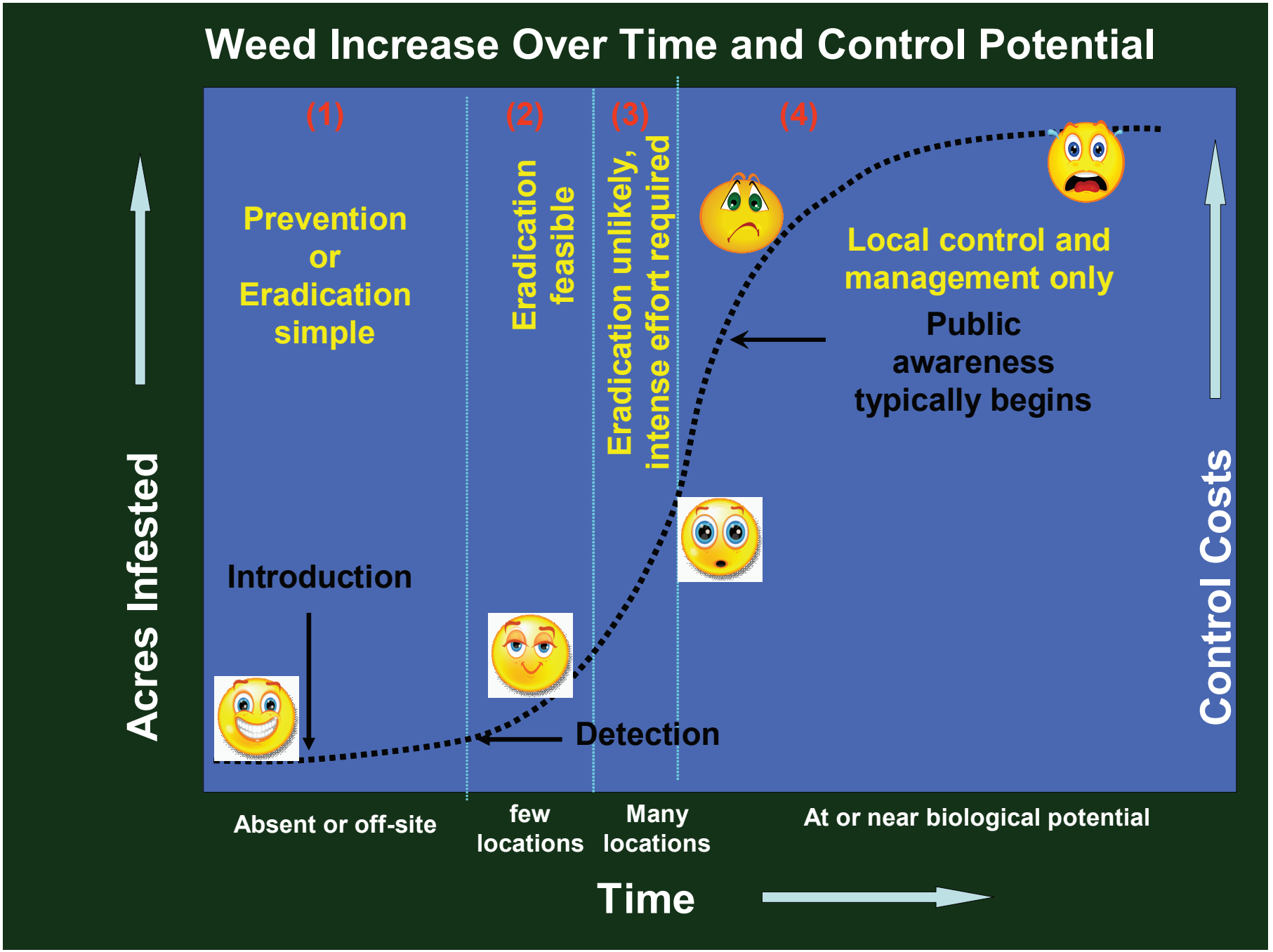


Crafting better public outreach strategies and materials

Asha Setty & Mary Petrilli
Golden Gate National Parks Conservancy

10:30 AM, Ventana Room

Behaviors worth changing	Population targeted
↑ Increase	
detecting early and responding rapidly	weed workers
setting clear management objectives	weed workers
↓ Decrease	
measuring outputs rather than outcomes	weed workers
spending so much time on widespread sp.	weed workers


Weed Increase Over Time and Control Potential
(1)
(2)
(3)
(4)
Prevention or Eradication simple
Eradication feasible
Eradication unlikely, intense effort required
Local control and management only
Public awareness typically begins
Introduction
Detection
Acres Infested
Control Costs
Absent or off-site
few locations
Many locations
At or near biological potential
Time

Improving our performance as weed workers

information alone is ineffective

too much information is ineffective

too little information is ineffective

concise information about performance is powerful

Improving our performance as weed workers

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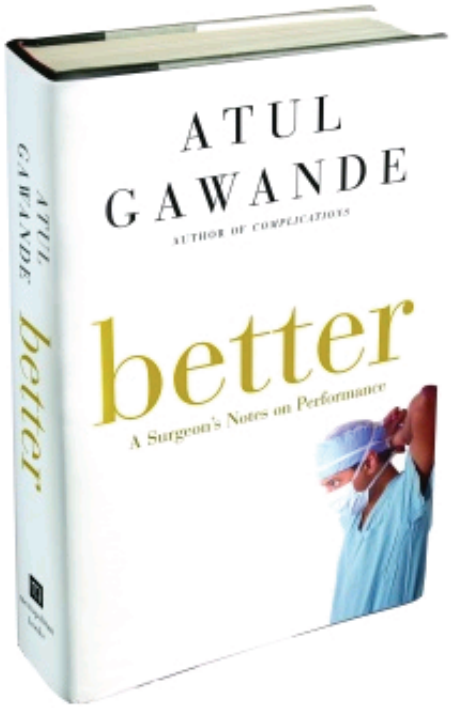


Atul Gawande
Better: A surgeon's notes on performance
(Metropolitan Books, 2007)

B.A.S. (Stanford), M.A. (Oxford)
M.D. (Harvard), M.P.H. (Harvard)
surgeon, Brigham & Women's Hospital
staff writer, *The New Yorker*
2006 recipient, MacArthur Genius Award

"The Score" — Reducing newborn mortality

1930s — 1 in 150 pregnancies ended in the death of the mother
1950s — 1 in 2,000 pregnancies ended in the death of the mother

Performance improving

1930s — 1 in 30 newborn infants died
1950s — 1 in 30 newborn infants died
2000s — 1 in 500 newborn infants die

Performance not improving

Performance improving

What happened beginning in the 1950s that reduced newborn mortality rates?

“The Score” — Reducing newborn mortality

The Apgar Score (1953)

score of 0 to 10
at 1 minute and 5 minutes after birth

color
0 if blue, 2 if pink

heart rate
0 if absent, 2 if >100/minute

respiration
0 if absent, 2 if crying

“It changed everything. It was practical and easy to calculate, and it gave clinicians at the bedside immediate feedback on how effective their care was.”
— Atul Gawande

An Apgar Score for surgery

"a 10-point surgical outcomes score"

estimated blood loss
0 if > 1 litre, 3 if < 300 ml

lowest heart rate
0 if > 85 beats/min,
4 if < 55 beats/min

lowest mean arterial pressure
[mmHg]

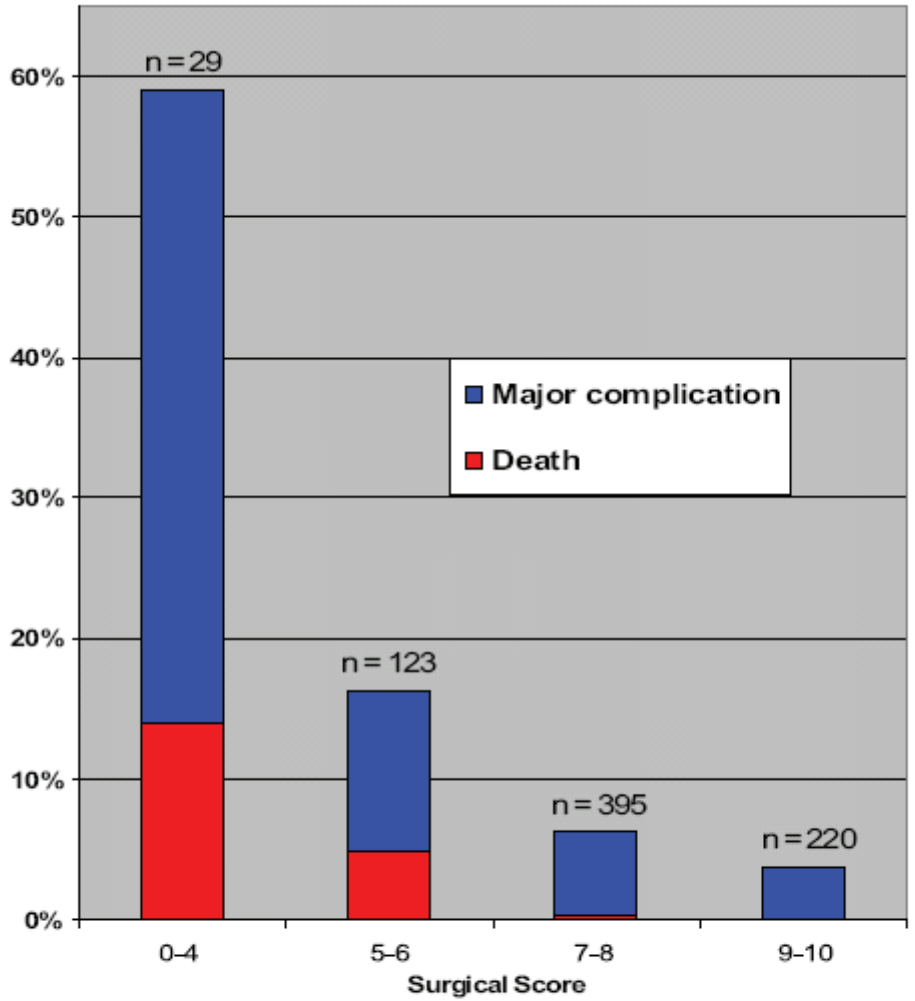


Figure 1. Thirty-day mortality and major complications for 767 patients undergoing general or vascular surgery, in relation to surgical scores. *$p < 0.0001$ for an association between surgical score and major complications, and for an association between surgical score and death.

Gawande et al. 2007 *J Am Coll Surg*

Apgar scores for weed work?

% of populations of low-incidence invasive plant species eliminated

(Holloran 2006 *NZ Plant Prot*, Holloran 2006 *Cal-IPC Proc*)

individuals removed

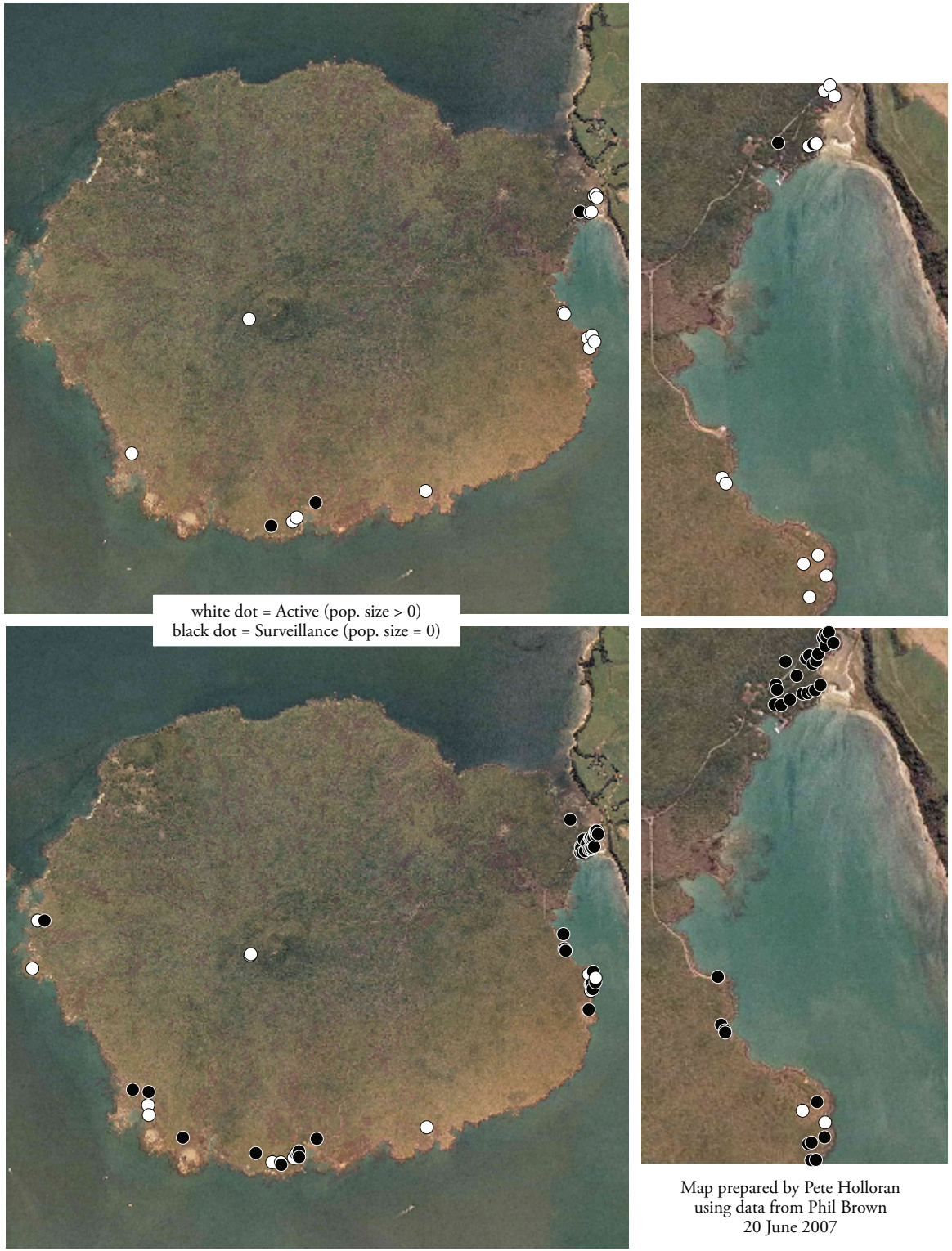
(many citations)

cost per acre to achieve particular management objective

(Hyland & Holloran 2005 *Cal-IPC Proc*, Klein 2006 *Cal-IPC News*)

acres treated

(but see Dale & Gerlak 2007 *Environ Management*)



Map prepared by Pete Holloran
using data from Phil Brown
20 June 2007

Low-incidence species targeted for elimination on Rangitoto Island, NZ

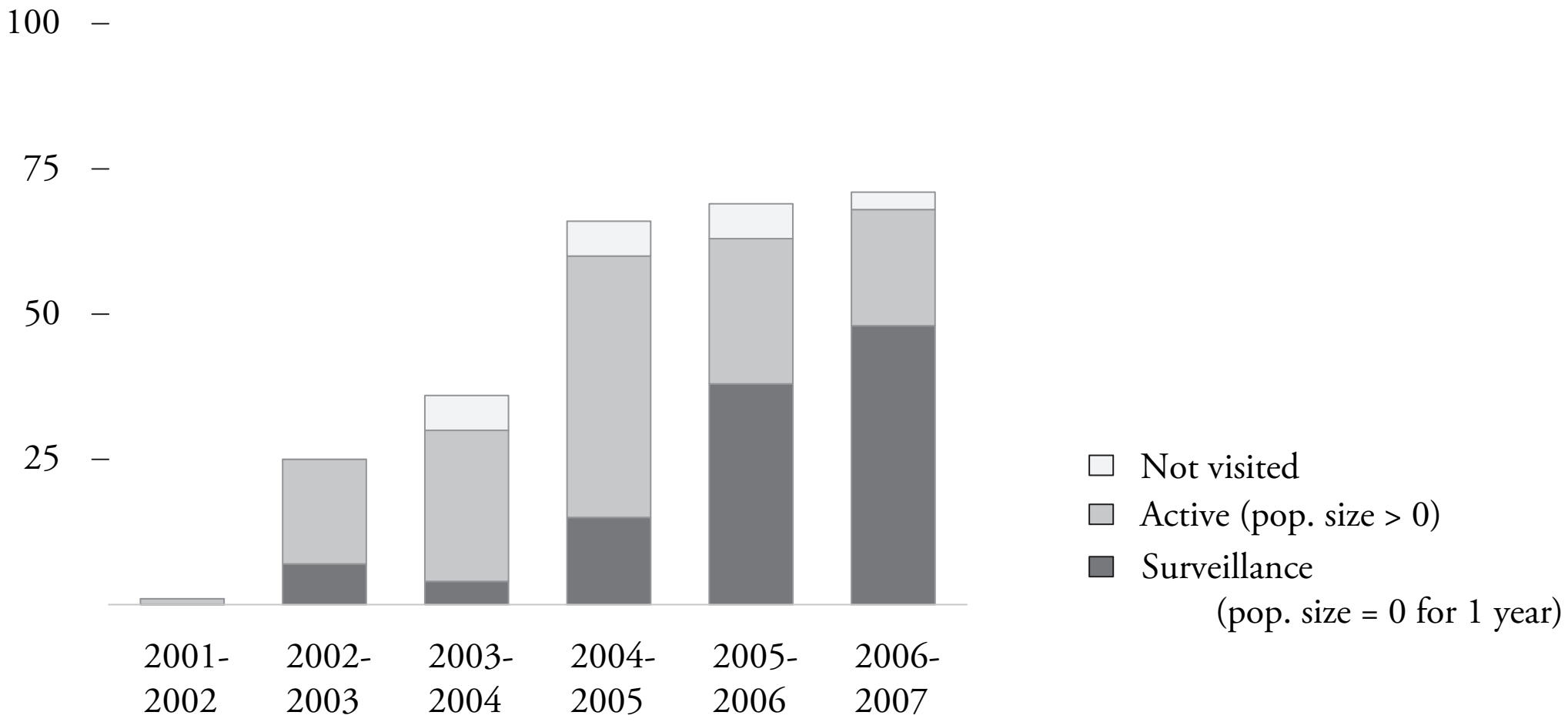
2003 (top)

2007 (bottom)

(inset of Islington Bay)

An effective performance measure

Number of low-incidence invasive plant populations targeted for eradication on Rangitoto



Percentage of all infestations that are eliminated (under Surveillance) for 26 low-incidence invasive plant species on Rangitoto. The last column on the right shows the absolute change in the percentage of eliminated infestations from FY2005-2006 to FY2006-2007.

Species	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	% change over last year
Acacia baileyana	-	0	0	0	0	0	0
Acacia longifolia	-	0	0	0	50	50	0
Acacia mearnsii	-	0	0	0	0	0	0
[*data for 21 species eliminated to improve legibility*]							
Tradescantia fluminensis	0	0	50	50	50	100	50
Vinca major	-	50	0	50	0	100	100
Rangitoto Island mean	0	28	12	25	50	66	16
# of targeted species	1	17	19	24	26	26	n.a.
# of sites not visited	0	0	6	6	6	3	-50

The Goldilocks Challenge — Getting the information just right

$500 cash award to the most effective concise summary of weed work performance

required

no more than 2 pages
real data across several years

recommended

clearly specify management objectives
focus on outcomes rather than outputs
include cost or effort data

send entries to peteh@ucsc.edu by 1 Dec 2007

"Using [the Apgar score] required observation and documentation of the true condition of every baby. Moreover, even if only because doctors are competitive, it drove them to want to produce better scores—and therefore better outcomes—for the newborns they delivered." —Atul Gawande