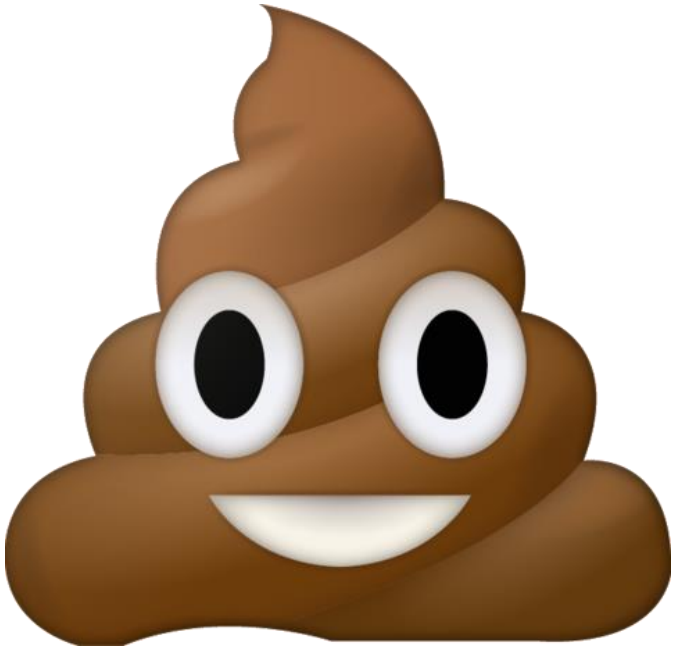
L O W E
Environmental
I m p a c t

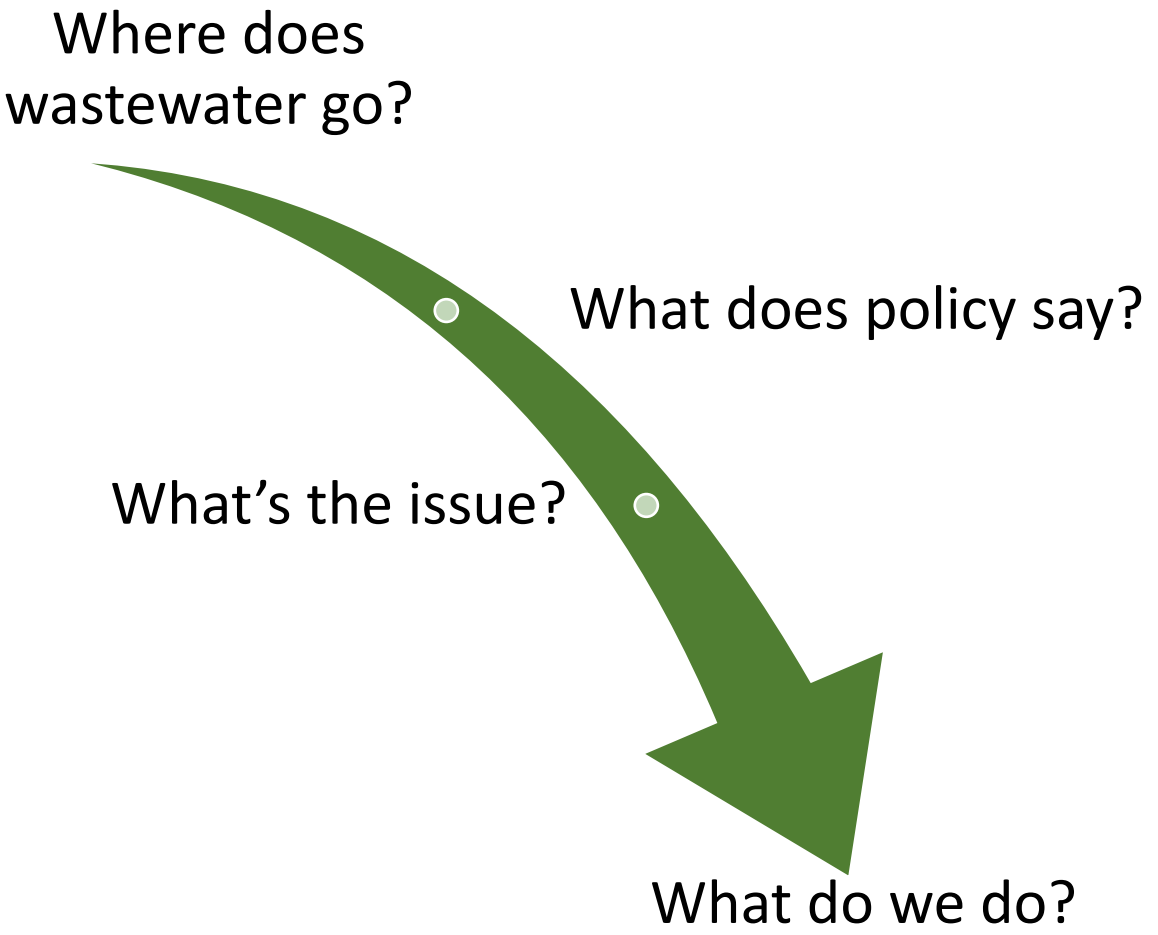
The land and water conundrum

Hamish Lowe

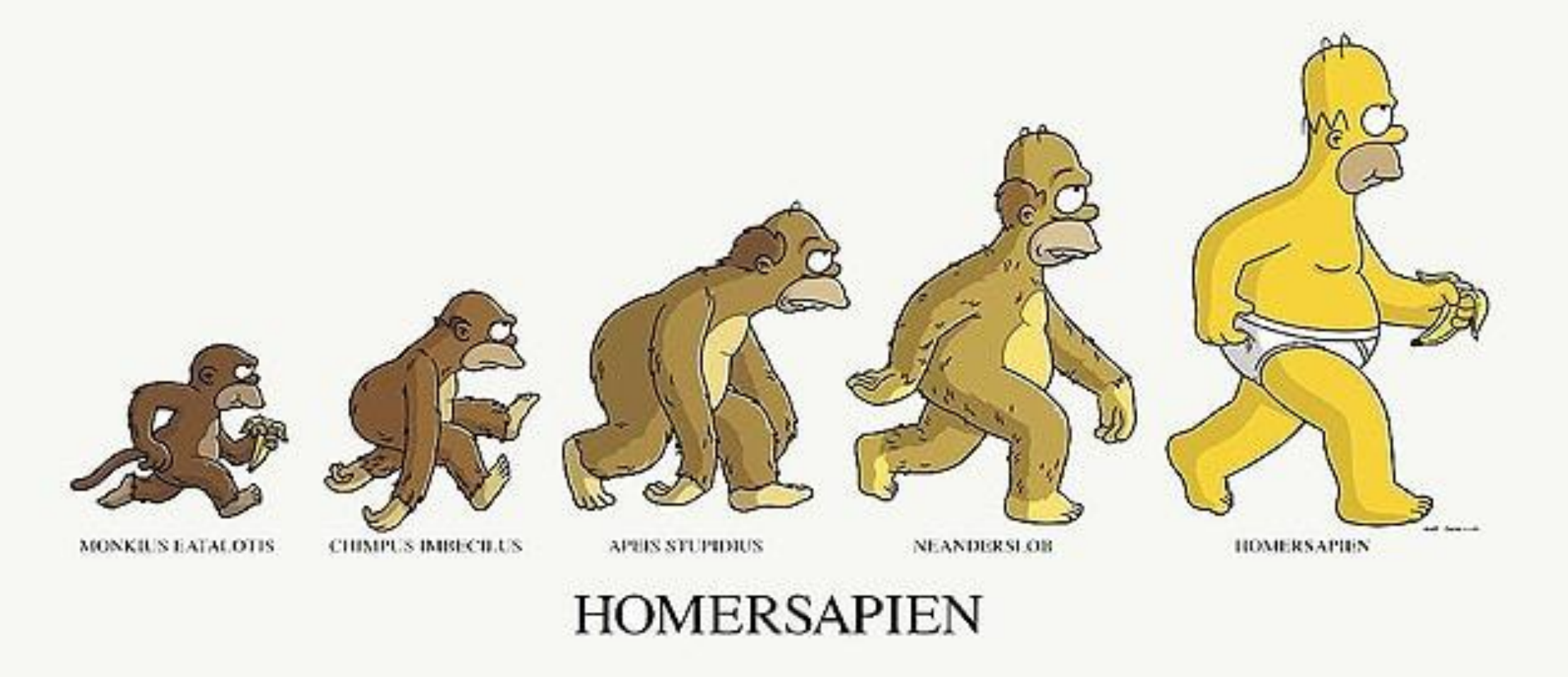
Introduction



Overview


Where does wastewater go?
What does policy say?
What's the issue?
What do we do?

History

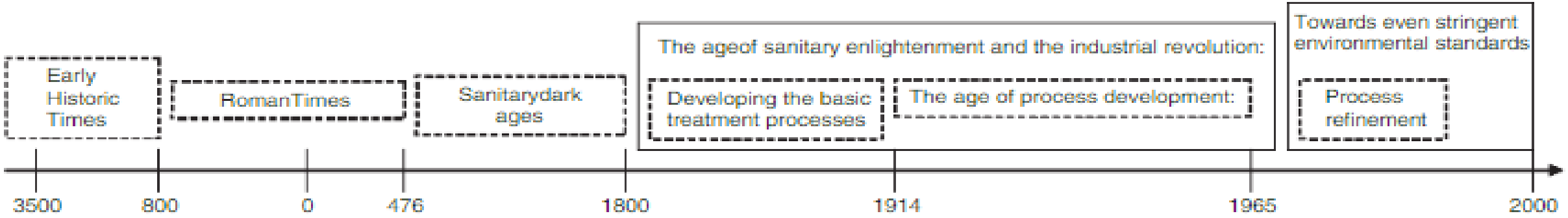

MONKIUS EATALOTIS
CHIMPUS IMBECILUS
APHIS STUPIDIUS
NEANDERSLOB
HOMERSAPIEN
HOMERSAPIEN

History


HEALTH PROMOTION
SURVEILLANCE
RESEARCH
MONITORING
PUBLIC HEALTH
RISK
ANALYSIS
OUTBREAKS
COMMUNICATION
EPIDEMICS
DISEASE PREVENTION

History

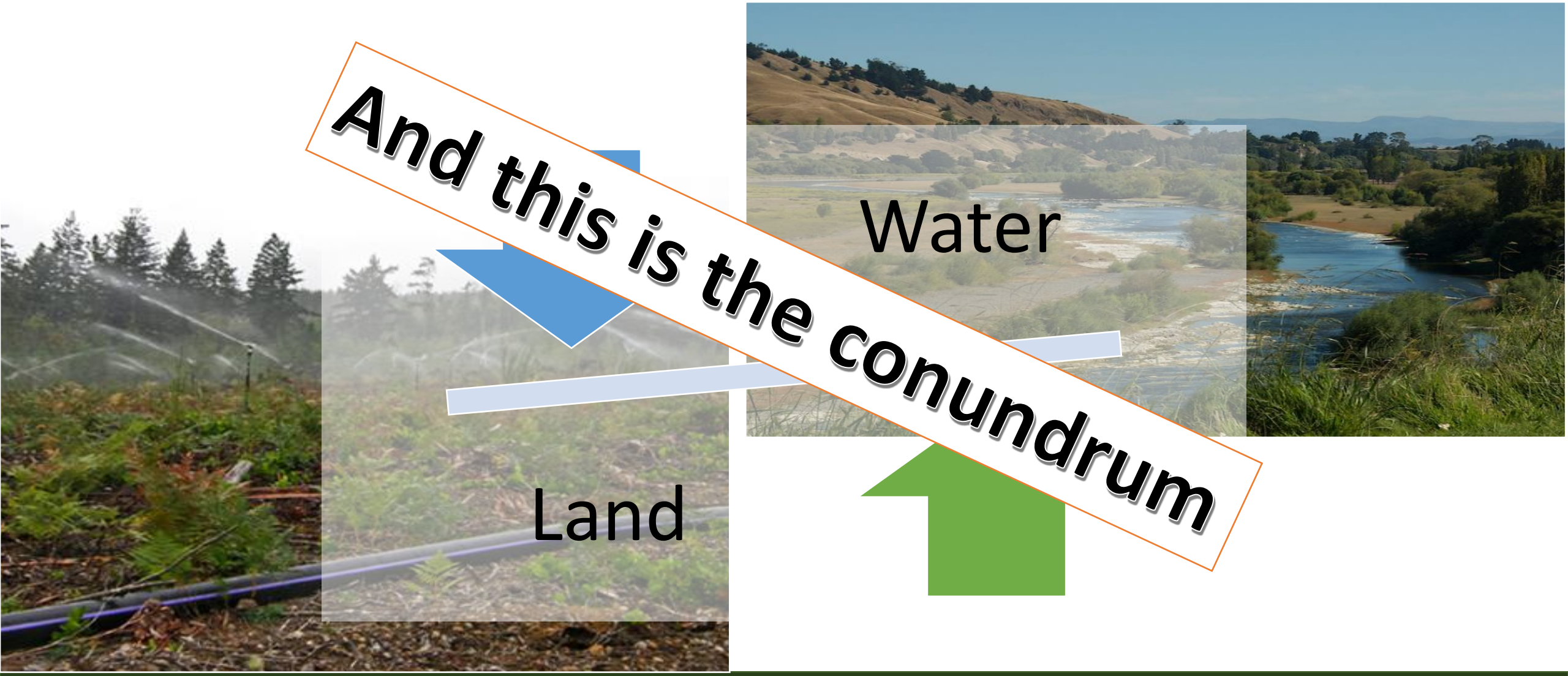
G. Lofrano, J. Brown / Science of the Total Environment 408 (2010) 5254–5264



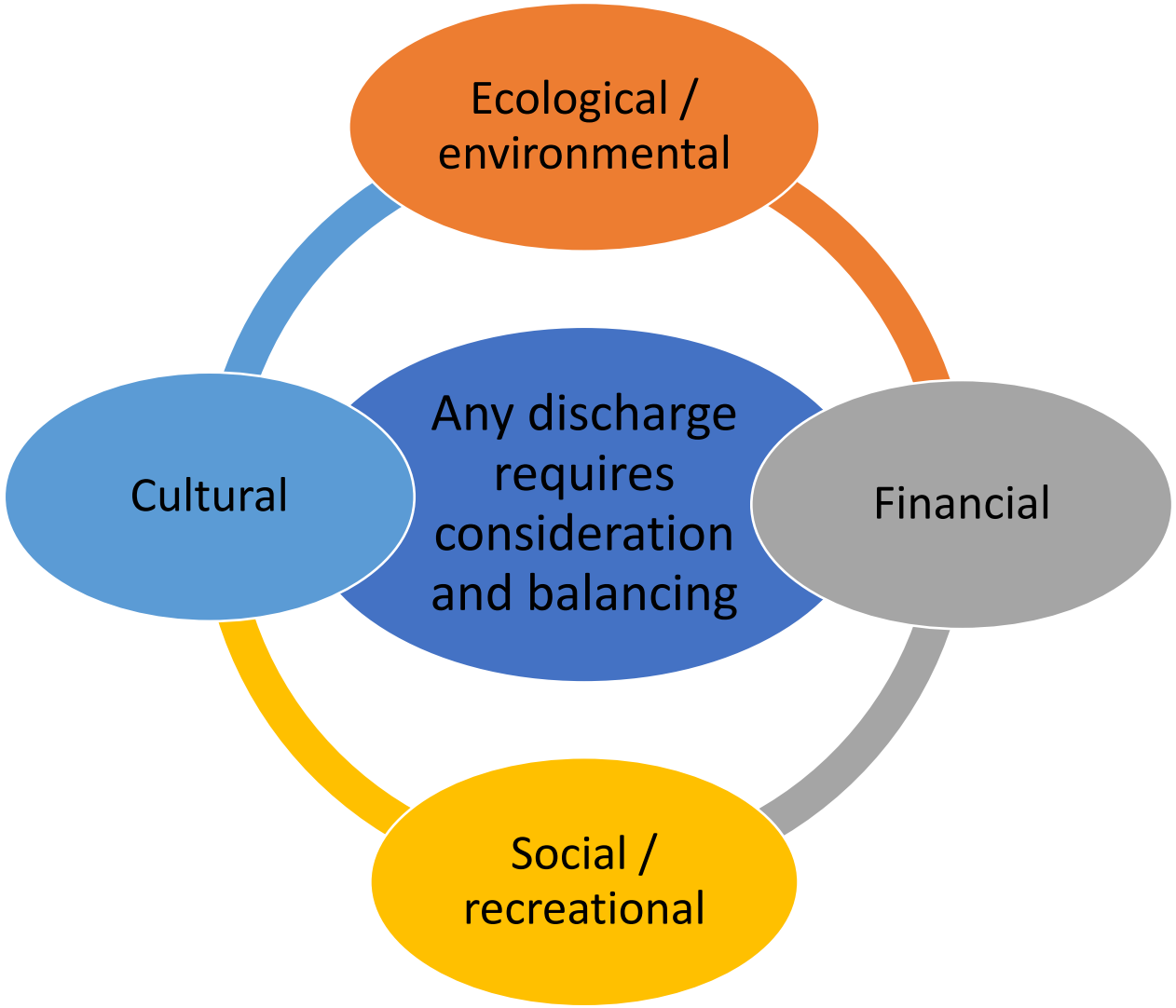
So where does our wastewater go?

Where Does Our Wastewater Go? by Maxwell

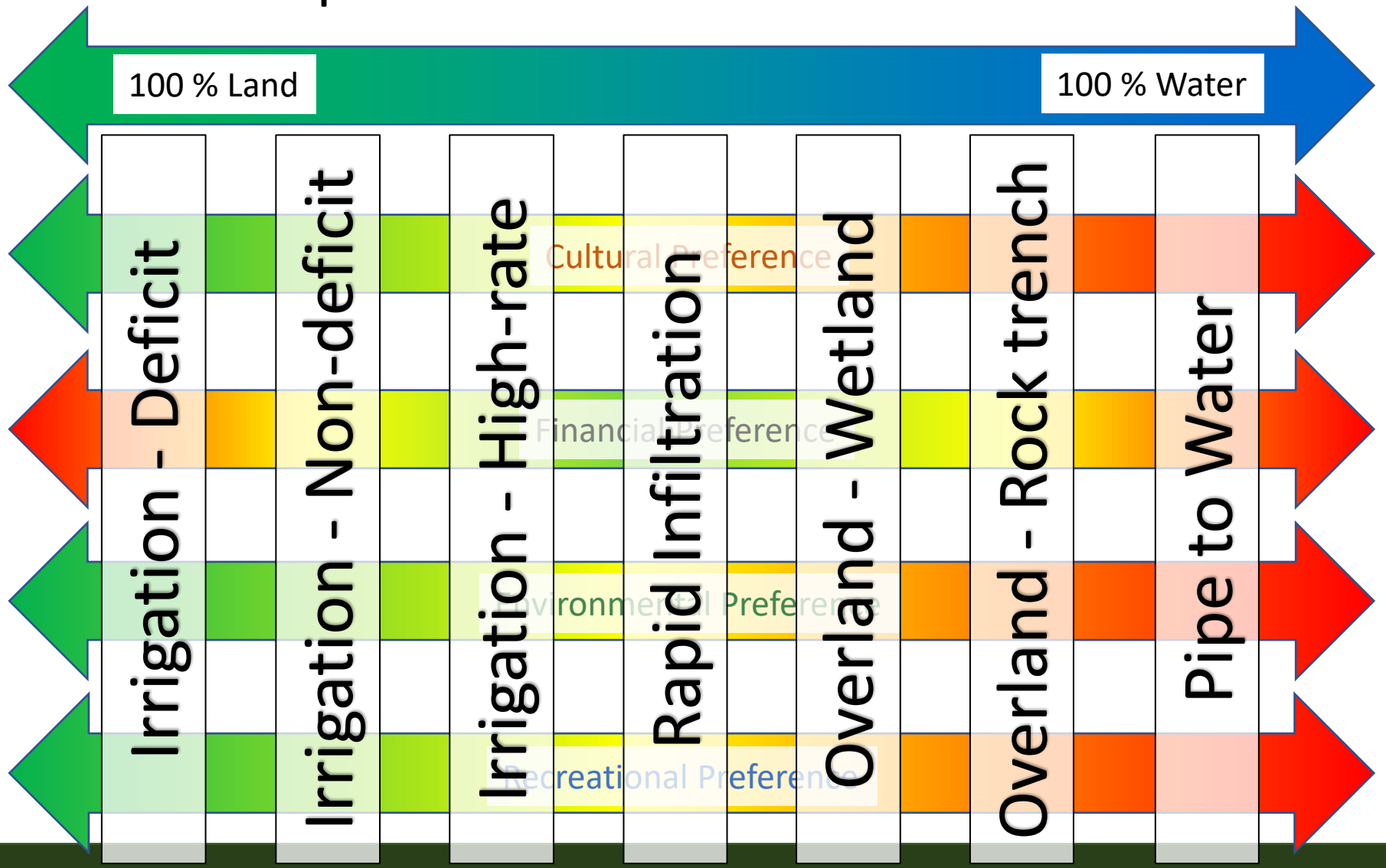
The choice



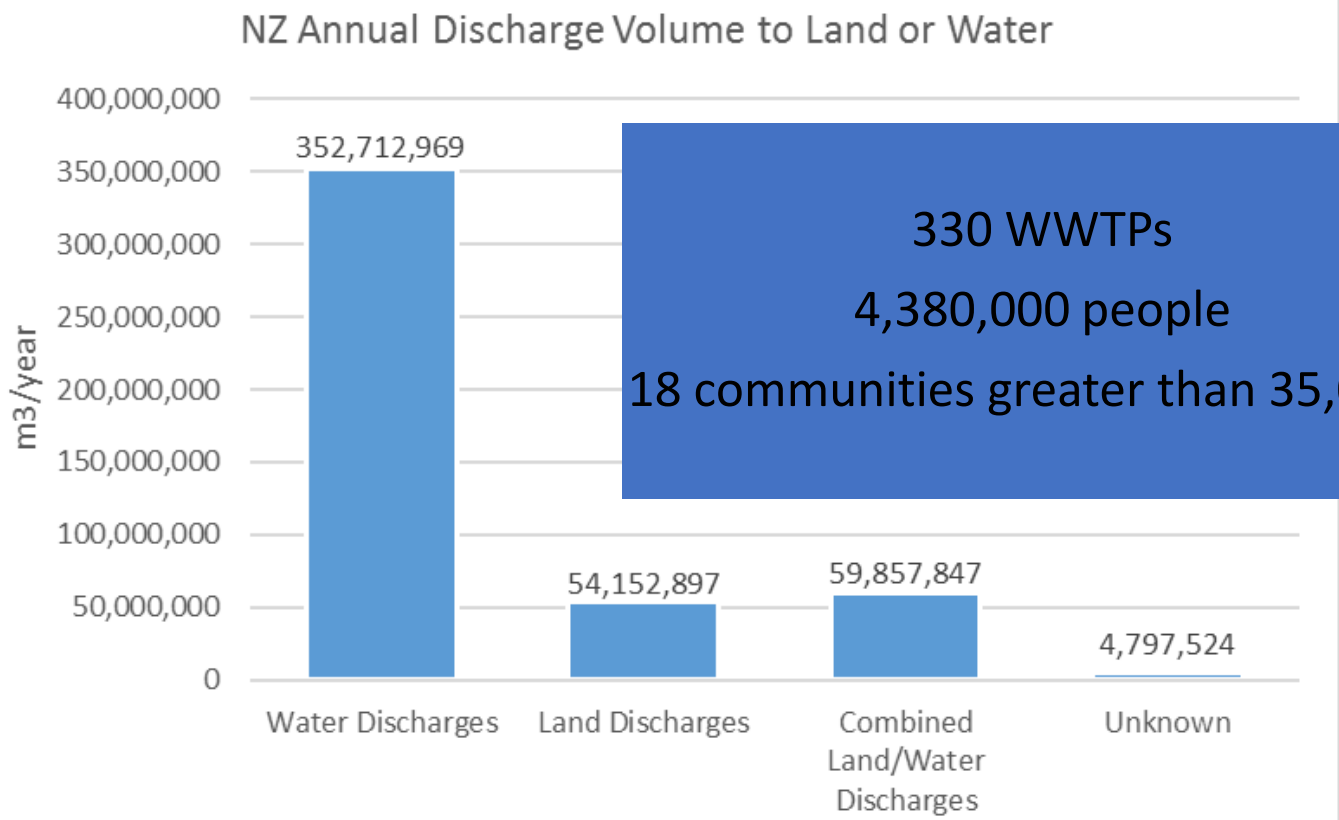
It’s a balance



Big Picture Options



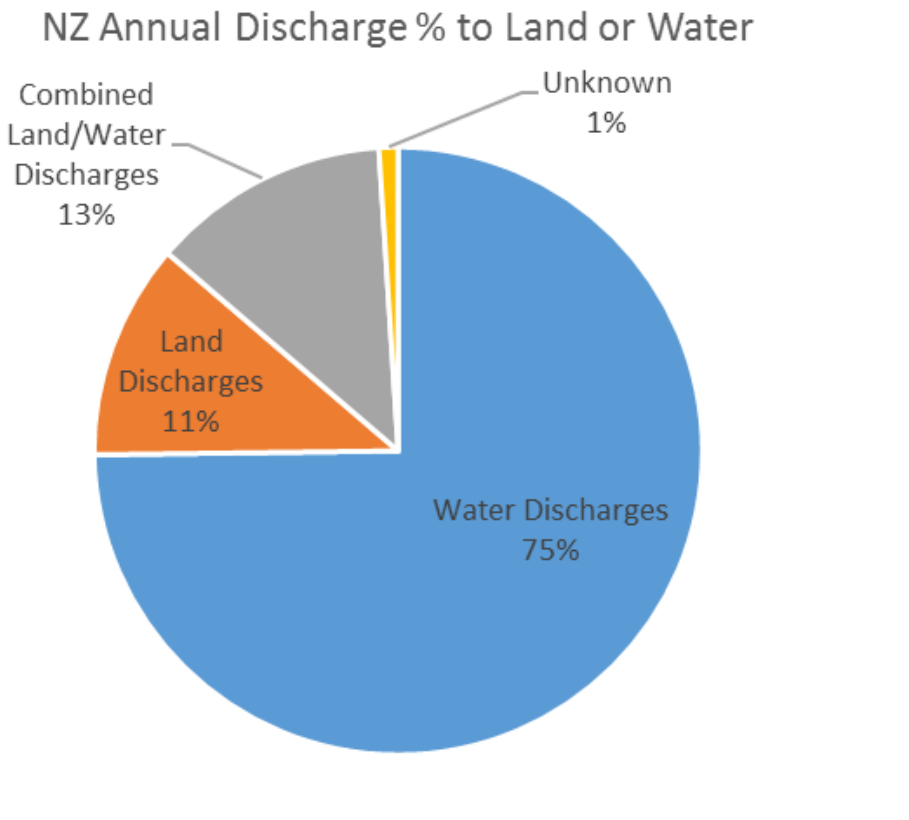
Survey - Volume Discharged



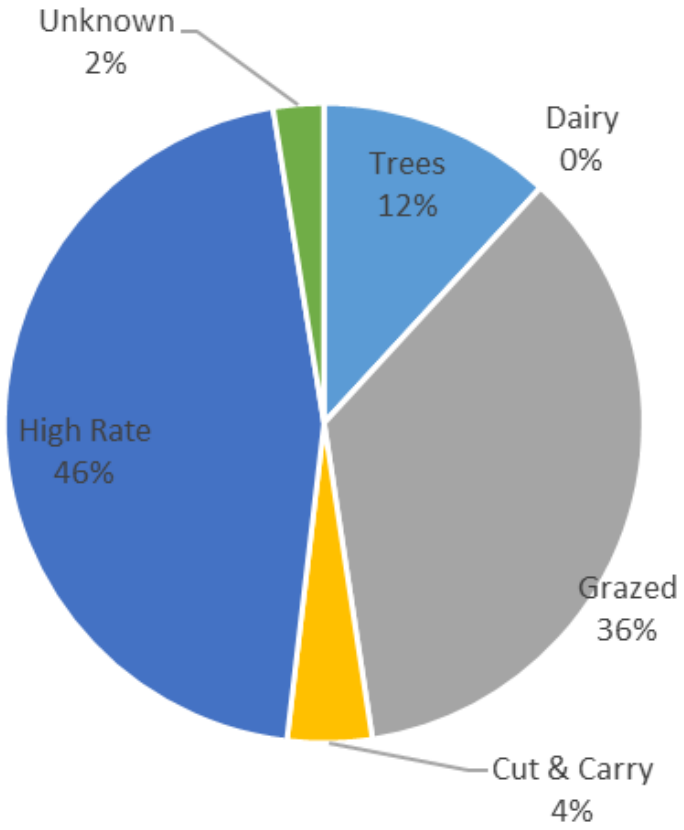
330 WWTPs

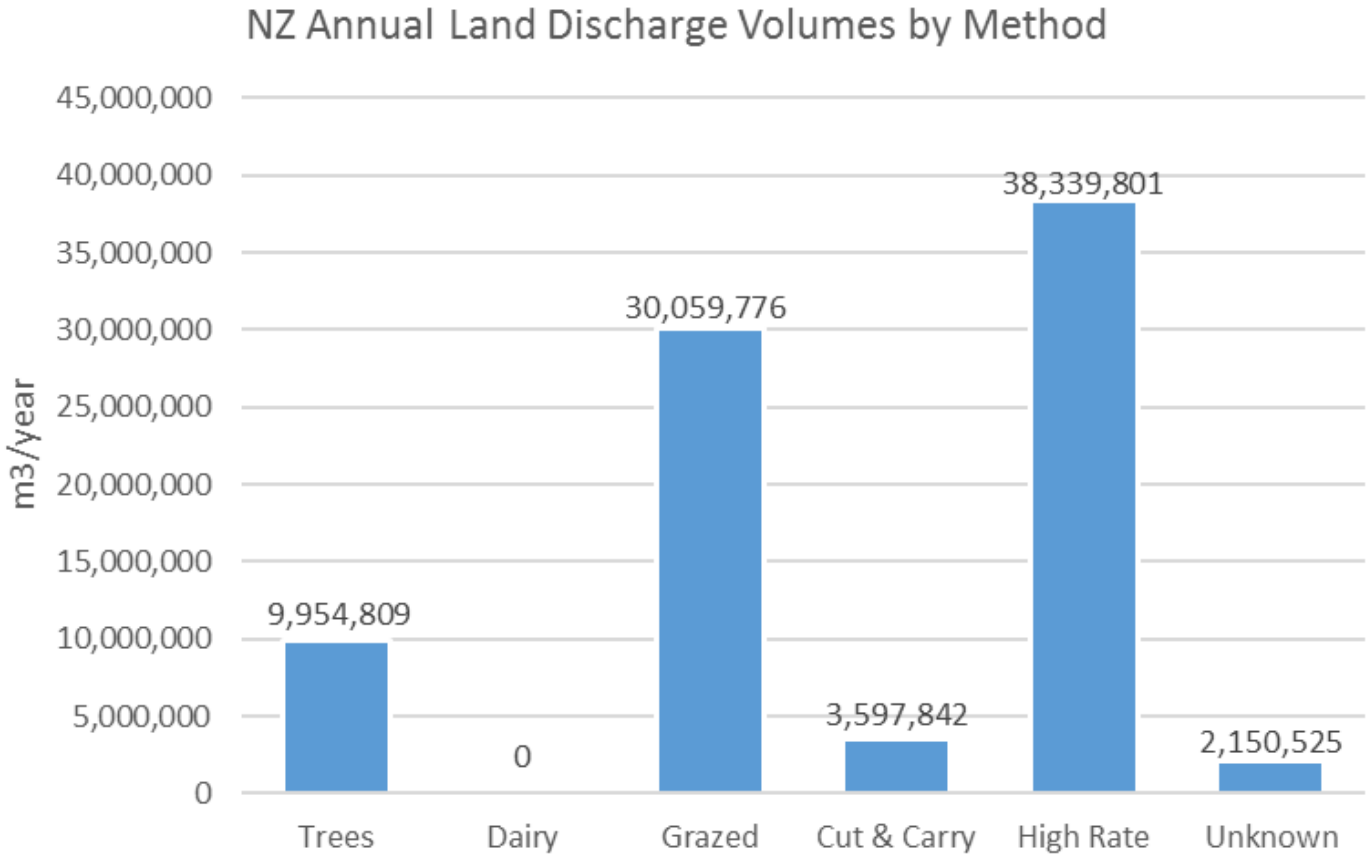
4,380,000 people

18 communities greater than 35,000 p



Survey - Where does it go - Land





Policy – What does it say

Plan	What it says
Canterbur Regional F	ge
Hawke's Bay Coastal Environme Sewage Di	The discharge of sewage from land which does not pass through soil or wetland, directly into water in the coastal marine area is
Horizons C	nto or ting minants nto surface water at times of low flow; and adopting different treatment and discharge options for different receiving environments or
Regional V for Northla Policy 8.7.	
Southland Statement: Policy WQUAL 8 – Preference	(a) a discharge to land is practicable;
Waikato R Regional Pl	re less than the adverse effects of direct discharges into water
Greater W Council - F	
West Coast Statement	
Auckland Statement 8.2.4.	

designed and managed to avoid sewage discharge into surface water

does not pass through soil or wetland, directly into water in the coastal marine area is inappropriate

discharging contaminants onto or into land as an alternative to discharging contaminants into water

phasing out, where possible, wastewater discharges to water
Prefer discharges of contaminants to land over discharges of contaminants to water

land-based treatment systems will be promoted

discharge of contaminants to land is promoted

discharges to land where this is more appropriate

all wastes derived from land returned to the land

So why….

People want land

and it is reflected in policy

Why are we still putting wastewater in surface waters?

We have a disconnect between:

- aspirations
- affordability
- practicality

Consideration	Issue	Water		Land	
		Constraints	**Opportunities**	**Constraints**	**Opportunities**
Size of community			Not an issue	Generally small - medium	
Weather dependency + river flows	Dry/wet weather High/low river flows	Low flows, no dilution, mixing and need storage	High flows, discharge can match river flows	May need to limit discharge, large storage or greater area	Dry weather, irrigation benefits
Volume variability	Seasonality/shock loads	Impacts on WWTP	No issue here	Impact on WWTP need storage	
Tangata whenua	Surface water discharge	Abhorrent			Consistent with tikanga
Impact on recreation	Does water go where people do	May conflict with water users		May conflict with land uses	Keep sport fields and golf course green.
Neighbours	NIMBY	All downstream users		Only neighbouring properties and d/g gw	

Water

Larger population size
High dilution in high river flows
Limited storage and only small area required
Minor potential for energy recovery

Land

Provides further treatment
Generally lower treatment standards
Irrigation benefits in dry weather
Storage needed - timing of irrigation and nutrients
Nutrients and water allow productive gain
Consistent with tikanga
Operational costs lower (?) and low tech treat systems can be used

Higher environmental standards
Higher level of treatment required
Limited dilution in low flows
Volume variability can affect WWTP
Potential storage required
Negative impact of nutrients on aquatic ecosystems
Often extensive monitoring of water and biota
Abhorrent Tangata Whenua
Conflict with water users and effects on downstream users
Potential pathogens and algal blooms
High skills and operational cost, unlikely to use low tech system

Smaller communities
High treatment level – still have volume
Large storage and area required
Questions over land suitability and ownership
Potential of leaching of nutrients and impacts on groundwater
Volume variability can affect WWTP
Potential effects on drinking water
Lot of additional monitoring
Potential conflict with recreational users/neighbours
Potential pathogens in water takes
Medium skills grade and levl of input

Limitations are not new….

January 26, 1907: Letter to the Editor, New York Times, by Rudolph Hering.

"Mr. Hering of the firm Hering and Fuller criticized the proposal to create sewage farms in the New York City area to receive the sewage generated by the City. Mr. Poultney Bigelow proposed using the "Berlin method" to apply sewage to the land so that it would be rendered harmless and not poison fish. Mr. Bigelow thought that the Hackensack meadows which were "useless barren waste[lands]" would be perfect for the application. Mr. Hering noted that one acre of land would be need to dispose of the wastes from 156 people. He suggested that a simple calculation would make it obvious that there was not enough land available to receive the flow from the City. Besides, Mr. Hering noted, there was an enormous mass of water floating by New York–The Hudson and East Rivers."

So why are there few land systems?

Knowledge

Certainty

Costs

Knowledge

- Are practitioners too specialised?
- Do we have the right project teams?
- Do we have the right project management?
- Are things done on the cheap?
- What skills are sought – convenience or cheapest?
- Use of inhouse expertise
- Use of existing information

Certainty – land (1 of 3)

Access to land

- From farmers
- Right conditions
- Right area

Perception of land use

- Crops for human consumption?
- Crops for animal grazing
- Non-consumptive crops

NIMBY

- Neighbour expectations
- Buffers

Investigation requirements

- Increasing analysis => less likely to happen

Certainty - decision making (2 of 3)

Not just consenting – but system adoption

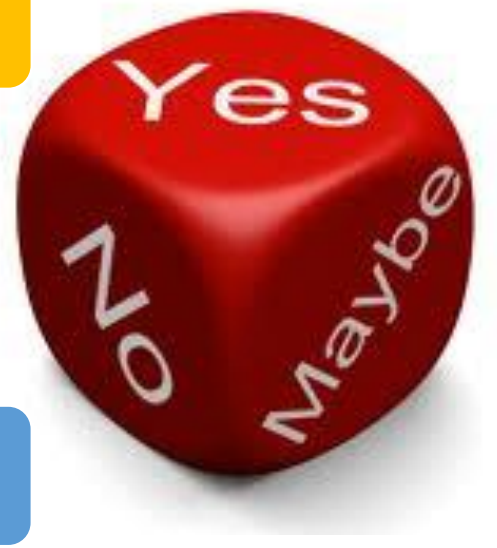
Water discharges

- While not necessarily supported, has been done before – process is clear even if rocky

Land discharges

- Supported but process less clear
- Less of them
- New to some people
- More variables

Being a council!



Certainty – consenting (3 of 3)

What role does consenting have in system adoption?

Currently large road block

- 1) process….. and costs
- 2) certainty => term

Costs

Where do they get incurred?

- Investigations
- Consenting
- Monitoring

Are they appropriate?

What are the alternatives?

Alternative contributions?

Scale and affordability – some fixed?

Who should fund – cost per m^3?

How do we get more on land?

Acknowledge we all contribute to waste

Take ownership – treatment and reuse v disposal

Be prepared to do something different

Don’t search for the ‘nth’ level of certainty

Move away from all or nothing approach

We all make decisions for the right reasons at that time; but need to accept changes do need to occur

Available land

Industry acceptance

Neighbour acceptance

Affordable solutions

The message

100 % land is not realistic in **vast** majority of cases

Surface water discharges are needed – relief valve

Policy should reflect multifaceted approach

Certainty is good, but can evolve and be provided over time

Community (and **politicians** and technical staff) should understand opportunities and limitations – not over promise/demand