

the River Restoration Centre

Working to restore and enhance our rivers

Delivering project aims

Jenny Mant

How to achieve?

- Monitoring/appraisal can be done whatever your budget

- Must be an integral part of your project process, from inception right through to project signoff and beyond.

What do you want to measure?

- Often this means defining what outcomes you want to demonstrate to your funders – link to project objectives
- Consider the risk and scale of your project
- Be as specific as possible with what you want to demonstrate with your project (e.g. Show a % increase in native marginal vegetation)

Risk and scale

Engineered log jams in rural setting 7	8	*River Widening of a large energy river to achieve a braided stream over 2km in rural area with nearby urban area* 9	C
4	5	6	B
Installation of upstream facing deflectors in a 50m reach in semi-rural area 1	2	*Creation of new channel meanders for 300m of a clay catchment with significant urban runoff* 3	A
a Small	b Medium	c Large	Scale

Risk

Risk

	Frequency of successful technique application in your catchment or very similar			
Frequency of use anywhere		Frequent	Often	Rare
	Frequent	1	2	3
	Often	2	3	4
	Rare	3	4	5

	River Type			
"Robustness"		Lowland	Intermediate	Upland
	High	1	2	3
	Medium	2	3	4
	Low	3	4	5

Risk and scale

		Frequency of use in catchment ⇨					
Failure for river type ⇩			1	2	3	4	5
		1	A	A	A	B	B
		2	A	A	B	B	B
		3	A	A	B	B	C
		4	A	B	B	C	C
		5	B	B	C	C	C

		Length ⇨					
Width ⇩			<50m	50-100m	100-200m	200-500m	>500m
		<2m	a	a	b	b	c
		2-10m	a	a	b	c	c
		>10m	b	b	b	c	c

Risk and scale

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Risk

Fixed point photography RRC Rapid Assessment Habitat Mapping (Biotope and River Corridor Survey (RCS)) Unit-area invertebrate survey Unit-time invertebrate survey	Fixed point photography RRC Rapid Assessment Habitat Mapping (Biotope and RCS) Unit-area invertebrate survey Unit-time invertebrate survey	Fixed point photography RRC Rapid Assessment Habitat Mapping (Biotope and RCS) Unit-area invertebrate survey Unit-time invertebrate survey River Habitat Survey (RHS)
Fixed point photography RRC Rapid Assessment Habitat Mapping (Biotope and RCS) Community Involvement (simple invertebrate assessment)	Fixed point photography RRC Rapid Assessment Habitat Mapping (Biotope and RCS) Unit-area invertebrate survey Unit-time invertebrate survey	Fixed point photography RRC Rapid Assessment Habitat Mapping (Biotope and RCS) Unit-area invertebrate survey Unit-time invertebrate survey RHS
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Risk

Size

Figure 7.1 Ecology Options/potential surveys

Appropriate cost effective monitoring

Target / Why	What	When	Who	How	Data	Cost	Priority
Water and sediment quality							
2.7 Improve water quality & sediment quality ☺	Demonstrate a reduction in coliform levels & nitrates and phosphates by 2014	Summer and Winter 2012 & 2014	Queen Mary, University of London	Sediment samples- using Lune Corer to replicate previous sampling approach	Existing - Baseline survey (Queen Mary, University of London, 2009 & Environment Agency, 2010)	No additional	High
Lake monitoring – Pre-phase 2 baseline							
2.8 Improve lake water and sediment quality and prevent eutrophic algal blooms ☺	Coliform levels, nitrates and phosphates in lake Detailed post works survey	Quarterly surveys from October 2011 - repeated Jan, April, July &for the duration of the A2N Ranger project Phase 2 monitoring strategy	LBBD – A2N Ranger Student MSc project - prior to Phase 2 works TBC	6 locations TBC (part of Target 1.9) Sediment surveys	Existing - Historical 1998 survey data. MSc 2009 study 'Feasibility assessment & a development proposal for an urban fishery' Existing – survey data.	LBBD – A2N Ranger/ No additional Phase 2 only	Medium (Phase 2)
2.9 **Aim to improve marginal habitat around lakes as over-grazing by geese has led to an impoverished boating lake**	Improvement in marginal habitat around boating lake (following the proposed provision of reedbeds)	Prior to commencement phase 2 works estimated 2015 (suggested 2015) (Post-works survey to be detailed in phase 2 monitoring strategy)	Student MSc project - prior to Phase 2 works TBC	Baseline study of marginal and in-lake habitat surveys	Existing - Lakes are included in 2010 Phase 1 habitat survey with species listed in a target note. Submerged plants not surveyed.	£1k, (could be done as part of the wider park plant survey work)	Low

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SMART

- E.g. Non-native species

Time-bound

Target / Why	What	When	Who	How	Data	Cost	Priority
2.3b ☺ **Ensure no invasive species present in or along the brook by 2015**	Ensure no non-native invasive species are present in 5 yrs time Species to look out for include - Floating pennywort - Water primrose - New Zealand pygmywort (crassula) - Japanese knotweed - Himalayan balsam - Giant hogweed.	RCS, RHS & Biotope mapping: Spring 2012 and 2014 (all 4 reaches) Ongoing/ ad-hoc	Environment Agency A2N Ranger	River Corridor Survey (RCS) will be sufficient in identifying all of the main plants and any plant invasive species Observe identification sheets using DEFRA guidance https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47	Invasive species reported absent in reaches 1-4 in URS report, 2009	EA in kind No additional cost	High

Specific

Measurable

Achievable (i.e. something to measure against)

Realistic **–YES!** **Monitoring partners agreed**

When to do it?

- Flexibility is essential
- Not all elements need to monitored at the same time of year
- Timing may dependant on specific weather conditions
- Some elements are seasonally driven and must be carried out at specific times of the year

Monitoring over time

		Ecology	Fisheries (salmonids)	Fisheries (Cyprinids)	Geomorphology/ sedimentology	Hydrology	Macrohytes	
Year 1	Spring	A - Rivers	A - eggs/fry			A		
	Summer	A – Wetlands and still waters	B - eggs/fry	A -fry/Adults	A	A	A	
	Autumn	A - Rivers	A - juveniles	A -Adults		A	B	
	Winter		A - Adult/spawning		B	A		
Year 2	Spring		A - eggs/fry		B	A	A	
	Summer		B - eggs/fry		A	A	B	
	Autumn		A - juveniles			A		
	Winter		A - Adult/spawning			A		
Year 3	Spring	A - Rivers	A - eggs/fry			A		
	Summer	A – Wetlands and still waters	B - eggs/fry		A	A	A	
	Autumn	A - Rivers	A - juveniles			A	B	
	Winter		A - Adult/spawning			A		
Year 4	Spring					A		
	Summer					A		

London – River Brent

Case: A concrete lined channel flows through a park within LB Brent. There is an opportunity to create a more natural channel river is isolated from people in the park by high railings.

Main targets:

- To improve the quality and diversity of freshwater fauna and flora of the river and its corridor,
- To improve the quality and diversity of terrestrial fauna and flora of the river margin;
- To improve the landscape / visual amenity value of the area?
- To maintain flood protection to existing properties;

SMART objectives:

- Increase the richness & density of invertebrates within the river channel
- Increase the richness of plants within the river corridor

SMART monitoring objectives:

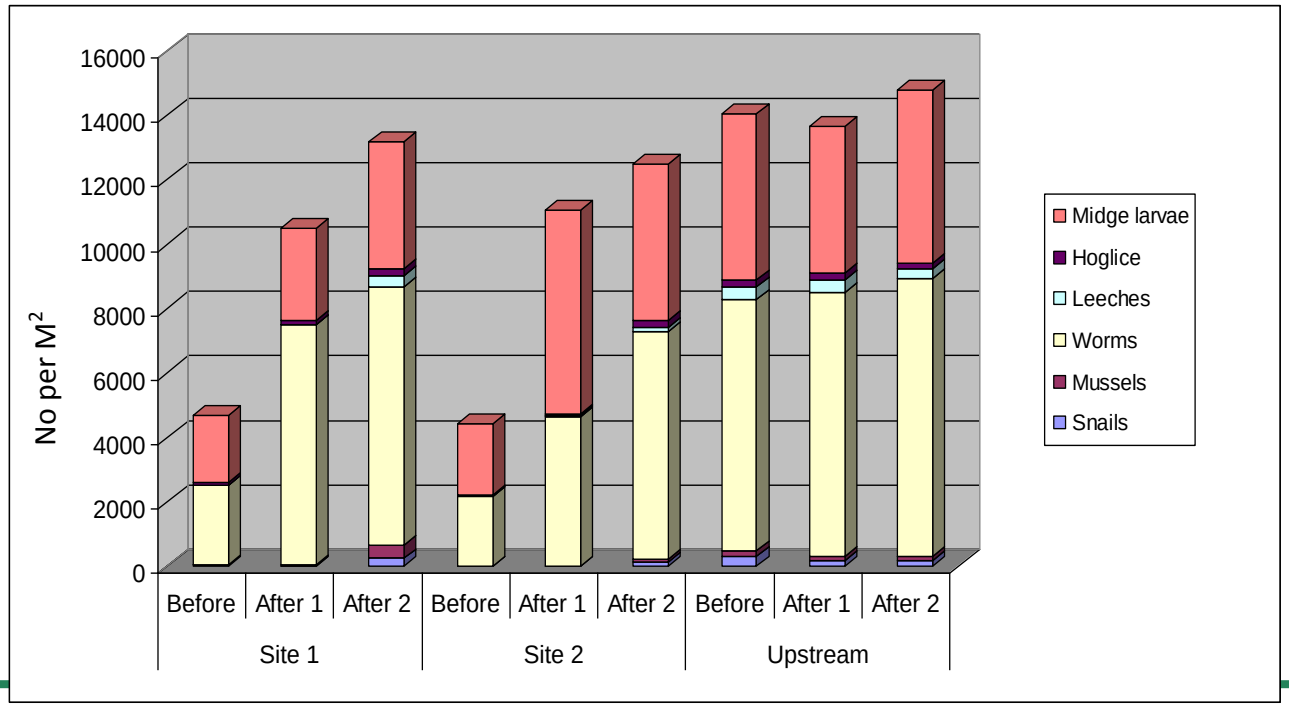
- Increase the richness and density of invertebrates within the river channel to match those recorded at the control site within 2 years
- Increase the richness of marginal aquatic plants within the river corridor from 0 to 6 within 4 years.

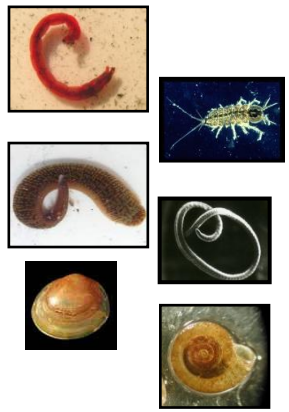
Constraints

- Frequent releases from upstream reservoir leading to higher discharges in already modified channel
- Limited channel access upstream – restricts choice of control site
- Water quality will limit ecological recovery

SMART monitoring objective:
Increase the richness & density of invertebrates within the river channel to match those recorded at the control site within 2 years

Quantitative Surber samples:
Replicated samples collected pre, post & 4 years post at the same time of year at a control site & 2 study sites.



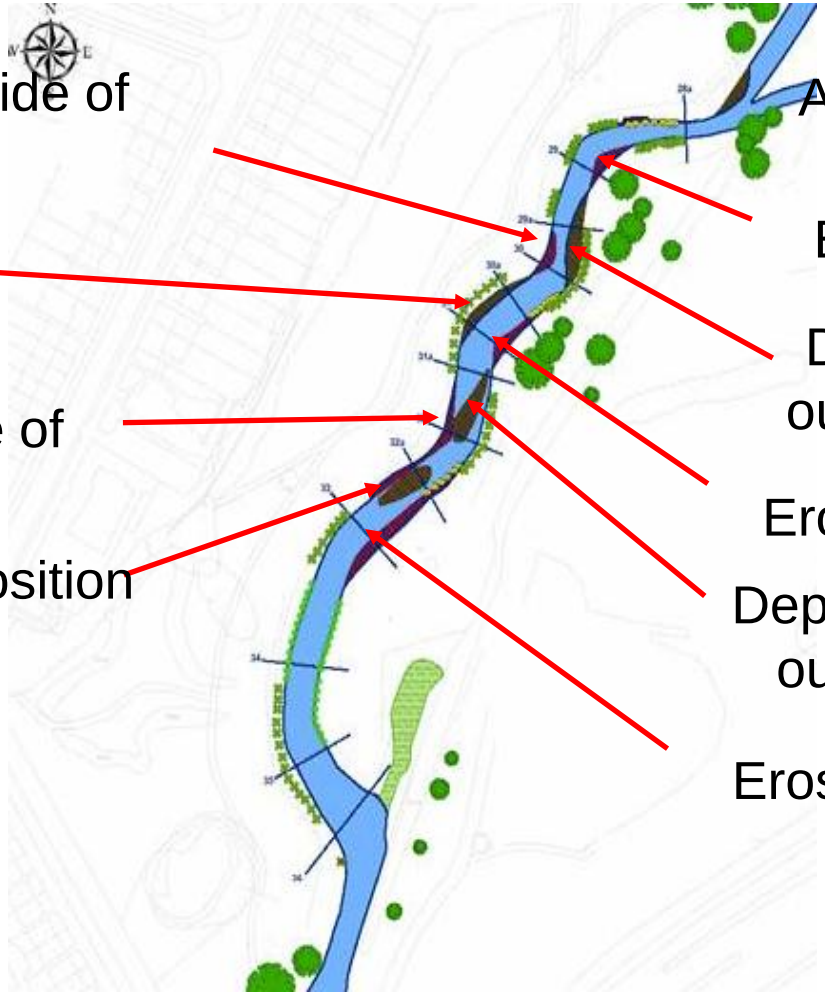


Restored 2003

Bank protection

Bank protection

Geomorphological Adjustment (2003-2008)



Willows

Deposition on outside of bend

Erosion on inside of bend

Restored 2008

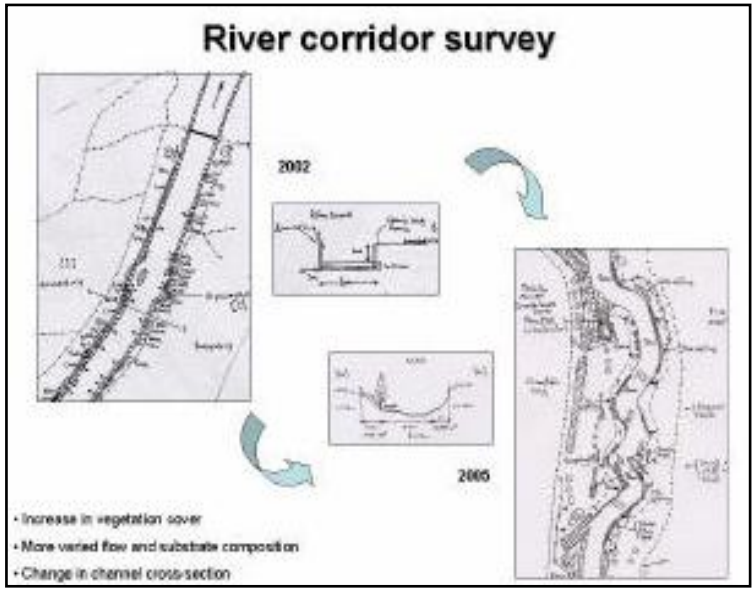
Willows

Erosion on inside of bend

Deposition on outside of bend

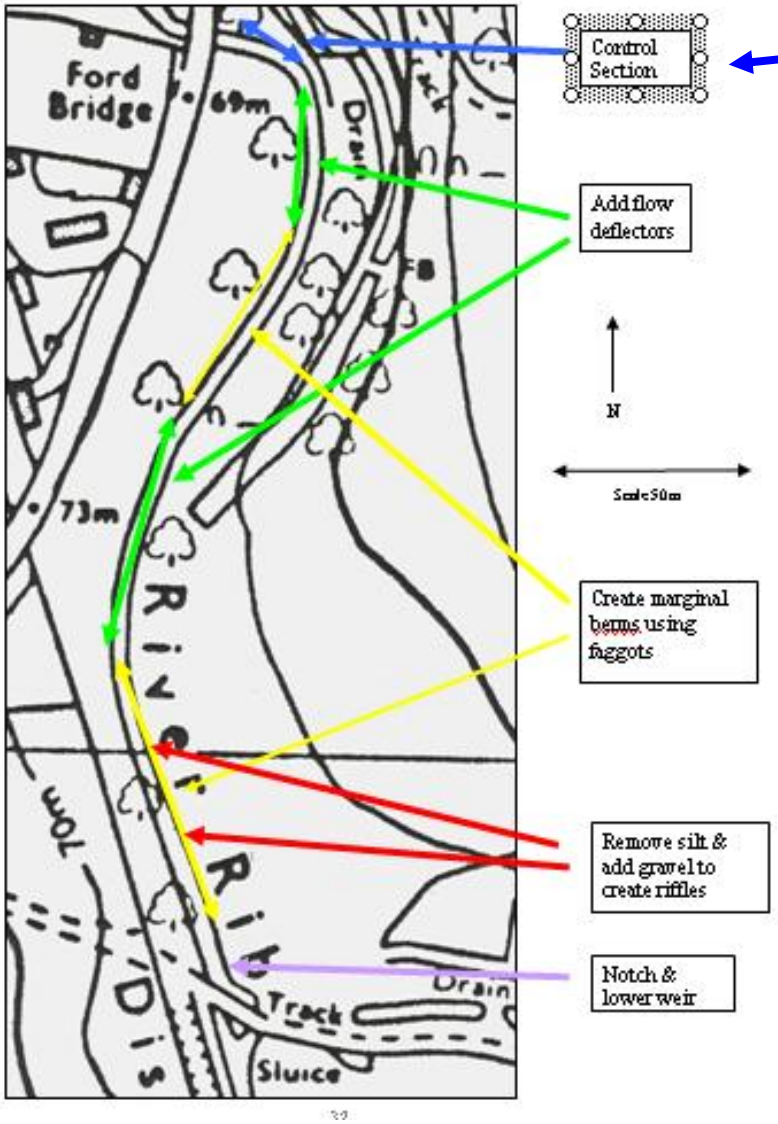
SMART monitoring objective:
Increase the richness of marginal aquatic plants within the river corridor from 0 to 6 within 4 years.

River Corridor Surveys:
Baseline, post & 4 years post at the same time of year.



Scientific Name	Common Name	PRE 2002	POST 2002	2006
Apium nodiflorum	Fools watercress		√	
Berula erecta	Lesser water-parsnip		√	
Carex spp.	Sedges			√
Carex pendulous	Pendulous sedge			√
Filipendula ulmaria	Meadowsweet		√	
Glyceria maxima	Reed sweet-grass			√
Eupatorium cannabinum	Hemp agrimony		√	
Impatiens glandulifora	Indian balsam			√
Iris pseudacorus	Yellow iris		√	√
Juncus acutiflorus	Sharp flowered rush		√	
Juncus articulatus	Jointed rush		√	
Juncus effuses	Soft rush		√	
Juncus inflexus	Hard rush		√	
Lythrum salicaria	Purple loostrife			√
Mentha aquatica	Water mint		√	√
Myosotis scorpoides	Water forget-me-not		√	
Phalaris arundinacea	Reed canary-grass		√	√
Phragmites australis	Common reed			√
Polygonum hydropiper	Water-pepper			√
Polygonum maculatum	Redshank			√
Rannuculus flammula	Lesser spearwort		√	
Rorippa sylvestris	Creeping yellow-cress		√	√
Schoenoplectus lacustris	Bulrush		√	
Scrophularia aquatica	Water figwort		√	
Sparganium erectum	Branched bur-reed		√	√
Symphytum officinale	Common comfrey		√	√
Typha latifolia	Reedmace		√	

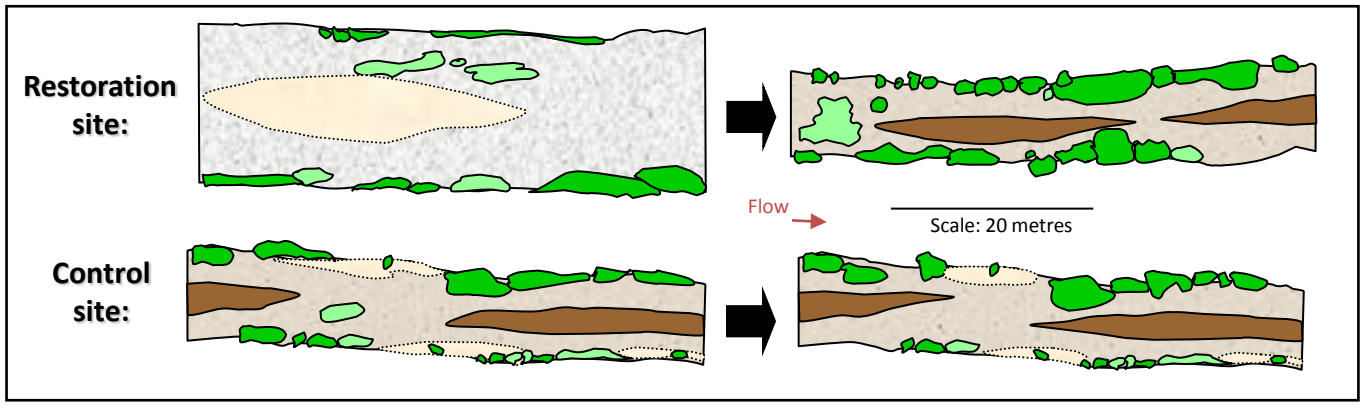
Adaptive management needed:
On-going issue with non-native invasive species management


Ford Bridge
69m
73m
70m
Track
Drain
Sluice
Control Section
Add flow deflectors
N
Scale 50m
Create marginal berms using faggots
Remove silt & add gravel to create riffles
Notch & lower weir

SMART monitoring objective:
Recreate the habitat composition of the control site in the restored section within 2 years.

Habitat Mapping:
Before
After
Control
Impact

Functional Habitat	Restored section		Control section	
	Before	After	Before	After
Emergent Vegetation				
Submerged Vegetation				
Fast Gravel				
Slow Gravel				
Sand				
Silt				



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PRACTICAL RIVER RESTORATION APPRAISAL GUIDANCE FOR MONITORING OPTIONS (PRAGMO)

Guidance document on suitable monitoring for river and floodplain restoration projects

Funded by:

Environment Agency

TRRT Thames Rivers Restoration Trust

SEPA Scottish Environment Protection Agency

WATER

2011

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