

Environmental Standard Operating Procedure

ESOP Name Water plant cutting

ESOP Number 1

Revision Date 22/02/2024

Related ESOPs [2. Biosecurity](#)



Aim

Water channels within the Broads have unique and important plant communities supporting a valuable freshwater ecosystem. Standard procedures aim to provide suitable navigation depth for boats whilst retaining an understory of vegetation for aquatic life.

Standard Methodology

- Cutting occurs with the water plant harvester from May to October, depending on aquatic plant growth.
- In tidal reaches (particularly the Yare, Wensum and Waveney) plant cutting should only occur against the flow/current to reduce the leakage of plant material.
- Cutting height is no less than 30cm above the bed, cutting height may be raised in deeper channels or where rare species are known to occur (to be specified in individual Method Statements).
- Leave a minimum non-intervention margin of 3 m from the bank where channel width is > 15 m and 2 m when channel width is <15 m, exceptions detailed in individual Method Statements;

- Monitor water depth regularly and cutting should proceed with caution in water < 1m in depth;
- Monitor water temperature and dissolved oxygen (DO) levels regularly. Cutting is dependent on strict thresholds (see Matrix below). Further details are presented in the Water plant Cutting Guidance Sheet;
- Propellers to be raised to the surface when navigating river margins or vegetation is floating on the surface;
- Disposal of small amounts of material, no greater than 1 m in height are placed bankside with local agreement.
- Where possible, half the disposal site should be left free of cut material to limit disturbance.
- No cutting after the end of September, to ensure sufficient food for wintering birds. Plants naturally die down at this time.
- Any issues should be reported to the Ecology team

Procedure

Pre-works

- Ecologists to survey the river reach to be cut to assess the health of the water plant community and allow record keeping of the long-term effect of cutting on water plant communities.
- Assessment will inform a site-specific Method Statement to guide the water plant cutter operator.

Operational

- Cut where aquatic plant growth is healthy enough to support it.
- Monitor water levels and dissolved oxygen to ensure cutting keeps within safe environmental limits.

Consultation

The following must be confirmed by the Ecology team before works commence:

- Natural England assent if site is designated.
- Wildlife licence application for protected species – to be determined by Ecology team through pre-works site assessment and survey.
- All works should follow best practice as detailed within the Environment Agency's technical guide: [Aquatic and riparian plant management: controls for vegetation in watercourses.](#)

Water temperature/DO Matrix

		DO Level %												
		40	43	45	47	48	49	50	55	60	65	70	80	90
Water Temp. °C	1	5.7	6.2	6.5	6.7	6.9	7	7.2	8	8.8	9.6	10.5	12.2	14
	2	5.5	6	6.3	6.5	6.7	6.8	7	7.8	8.6	9.4	10.2	11.9	13.5
	3	5.4	5.8	6	6.4	6.5	6.6	6.8	7.5	8.3	9.1	9.9	11.5	13
	4	5.2	5.6	5.9	6.2	6.3	6.4	6.6	7.4	8.1	8.8	9.6	11.3	12.7
	5	5	5.4	5.7	6	6.1	6.3	6.5	7.1	7.8	8.6	9.3	10.8	12.4
	6	4.9	5.3	5.5	5.8	6	6.2	6.3	6.9	7.6	8.3	9	10.4	12
	7	4.7	5	5.4	5.6	5.7	5.8	6	6.7	7.3	8.1	8.7	10.1	11.6
	8	4.5	4.9	5.2	5.4	5.6	5.7	5.9	6.5	7.1	7.8	8.4	9.6	11.2
	9	4.4	4.8	5	5.3	5.5	5.6	5.7	6.3	7	7.5	8.1	9.4	10.9
	10	4.3	4.6	4.9	5.1	5.3	5.4	5.5	6.2	6.7	7.4	7.9	9.2	10.5
	11	4.2	4.5	4.7	4.9	5	5.2	5.4	5.9	6.5	7.1	7.6	8.9	10.3
	12	4.1	4.4	4.6	4.8	4.9	5	5.1	5.8	6.4	6.9	7.5	8.5	9.7
	13	4	4.3	4.5	4.7	4.8	4.9	5	5.6	6.2	6.8	7.4	8.4	9.5
	14	3.9	4.2	4.4	4.5	4.6	4.8	4.9	5.5	6	6.5	7.2	8.2	9.3
	15	3.8	4.1	4.2	4.3	4.5	4.6	4.8	5.4	5.9	6.4	7	8.1	9.2
	16	3.7	4	4.1	4.2	4.4	4.5	4.7	5.1	5.6	6.2	6.7	7.8	8.9
	17	3.6	3.8	3.9	4.1	4.3	4.4	4.5	5	5.5	6	6.5	7.6	8.6
	18	3.5	3.7	3.8	4	4.2	4.2	4.3	4.9	5.4	5.8	6.4	7.4	8.3
	19	3.4	3.6	3.7	3.9	4	4.1	4.3	4.8	5.2	5.7	6.2	7.2	8.2
	20	3.4	3.5	3.6	3.8	3.9	4	4.2	4.6	5.1	5.6	6	7	8
	21	3.3	3.4	3.6	3.7	3.8	3.9	4.1	4.5	5	5.4	5.9	6.8	7.8
	22	3.1	3.3	3.5	3.6	3.7	3.8	4	4.4	4.8	5.2	5.7	6.6	7.5
	23	3	3.2	3.4	3.6	3.6	3.7	3.9	4.3	4.7	5.1	5.6	6.5	7.4
	24	2.9	3.1	3.3	3.5	3.5	3.6	3.7	4.1	4.6	5	5.5	6.4	7.1
	25	2.8	3.1	3.2	3.4	3.5	3.6	3.7	4	4.5	4.9	5.4	6.2	7

Readings given in mg/l GREEN: Proceed with cutting AMBER: Proceed with care, take regular readings RED: Stop cutting

Risk Assessment

Hazard	Initial Risk			Controls / Safeguards / Precautions	Revised Risk		
	S	L	R		S	L	R
Deoxygenation of the river channel leading to loss of aquatic life	4	4	C	Monitor DO levels in line with the DO matrix and stop cutting immediately if DO levels fall in the red section of the matrix.	4	2	A
Removal of aquatic invertebrates	2	4	B	Disposal of cut material in proximity to waterway to allow migration back to the watercourse (as above)	2	3	A
Spread of non-native invasive species	3	3	B	Undertake pre-works survey Follow biosecurity measures (see ESOP 2)	3	2	B
Removal and/or damage to rare/protected aquatic plants	2	5	B	Identification of key plant species prior to works Where rare plant species are located, ensure proportion of population is retained within the dyke Raise cutting height; pre-survey for such species	2	3	A
Heaps of decaying cut material deoxygenating the watercourse	3	3	B	Cut heaps to be 2 to 3 m from water's edge, or half way between channel and soke dyke	3	1	A
Uprooting of plants in windy conditions	3	3	B	Monitor for uprooted plants if conditions are windy. Pause works and consult ecologist if plants are uprooted.	3	1	A
Disturbance of silt substrate	3	4	C	Monitor water depth regularly	3	3	B
Creation of floating material	2	4	B	Small cut fragments that escape the harvester to be collected	1	4	A

Matrix

		LIKELIHOOD					RISK
		Very unlikely	Unlikely	Moderately likely	Likely	Very likely	
SEVERITY		1	2	3	4	5	
Low (minimal, short-term disturbance levels and negligible damage to native habitats.)	1	A	A	A	A	A	A OK. Work to provisions in risk assessment
Medium (moderate, short-term disturbance levels, some damage to native habitats/species. Regenerates quickly.)	2	A	A	A	B	B	B Proceed with caution. Dynamically review risks.
High (high disturbance levels over a longer period and displacement of species. Damage to native habitats. Significant time to regenerate)	3	A	B	B	C	C	C Cancel task. Approach project in a different way.
Very High (Long-term disturbance with displacement/death of species. Significant damage to native habitats that takes a significant time to regenerate.)	4	B	B	C	C	C	