I.S.RIVERS LYON 2018

Cerema

vnf Voies navigables de France

DOES DREDGING IMPACT WATER QUALITY ?

• Context and Objectives :

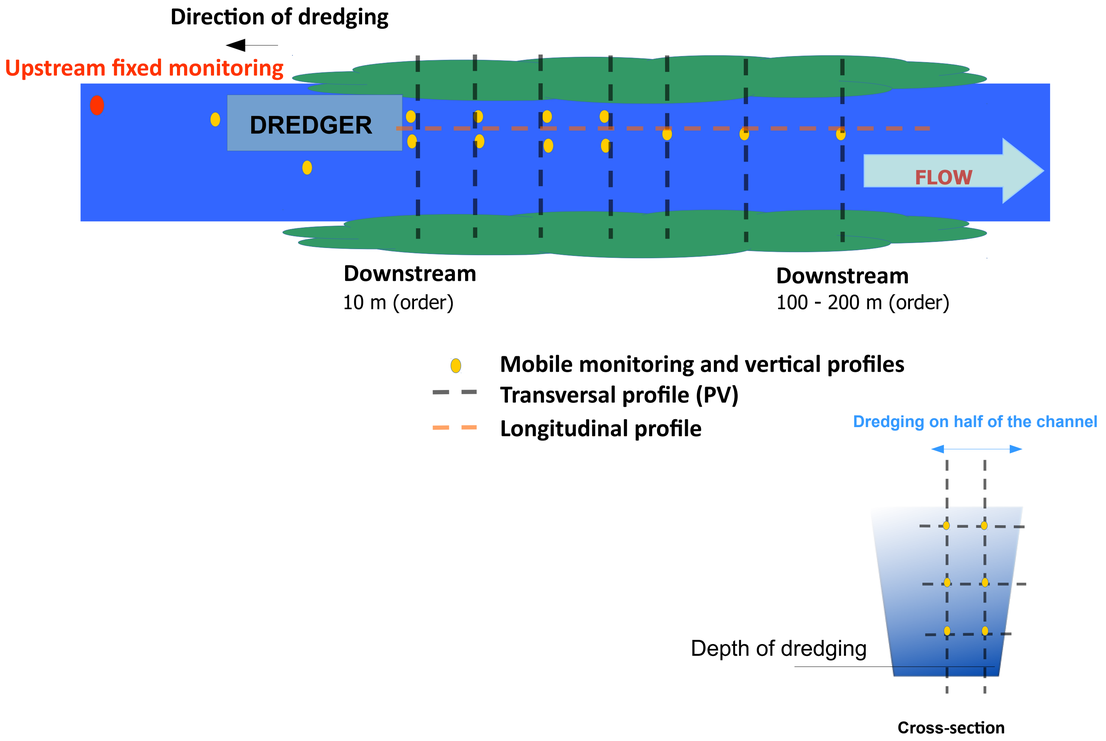
- The dredging management Plan of VNF for Seine basin and limited in situ experimental monitoring on small sites
- Estimate the environment sensibility and define methodological tools of monitoring
- VNF / Cerema partnership ; a steering committee : environmental police, AFB, VNF, basin agency, Cerema

• Four monitoring sites in 2015-2017

Sites	Dates of follow-ups	chi./ecological state	Sediments	environ. Sensibility	Yield m³/j
Oise Isle-Adam (95)	2015 2016 2017	bad / good	Non-inert non-dangerous (Hg =1,07 mg/kg + HCT 659mg/kg)	high (catchment)	240-360
Armançon Migennes (89)	2016	good/good	inert	high (ZNIEFF1 + spawning grounds)	609
Seine aval Moisson (78)	2016 2017	good/good	inert	high	408
Canal Aisne/ Marne Courcy (51)	2017	mediocre/ good	inert	low	240

• Physico - chemical protocol 2015

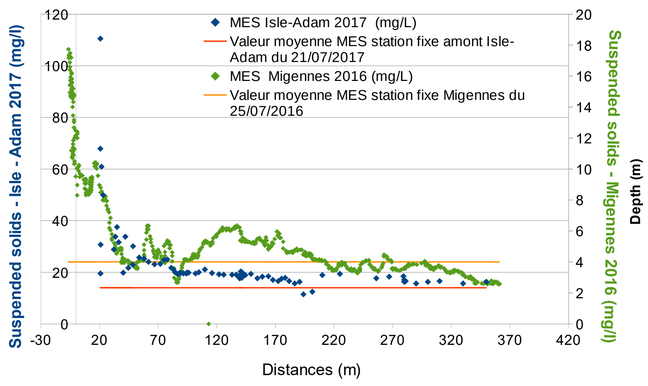
- Before dredging, initial state by literature review (AFB and VNF)
- During dregding, physico-chemical monitoring :
  - pH, dissolved O_2, T°, turbidity, conductivity, reduction potential, NH_4^+, NO_3^-
  - Upstream fixed monitoring
  - Downstream mobile monitoring (vert./long. profiles)



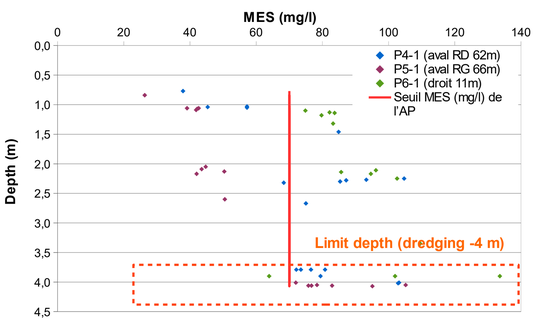
• Turbidity and Suspended solids : good indicators of dredging impact

- Decrease quickly upstream of the dredger and increase with depth
- The impact distance : 50-70 m upstream of the dredger ; return in the initial state towards 200 m

Longitudinals profiles, Migennes (4 000 m³, 609m3/j), Isle – Adam (1500 m³, 360 m³/j)



Vertical profile, Isle-Adam 2016



• Other slightly varying parameters

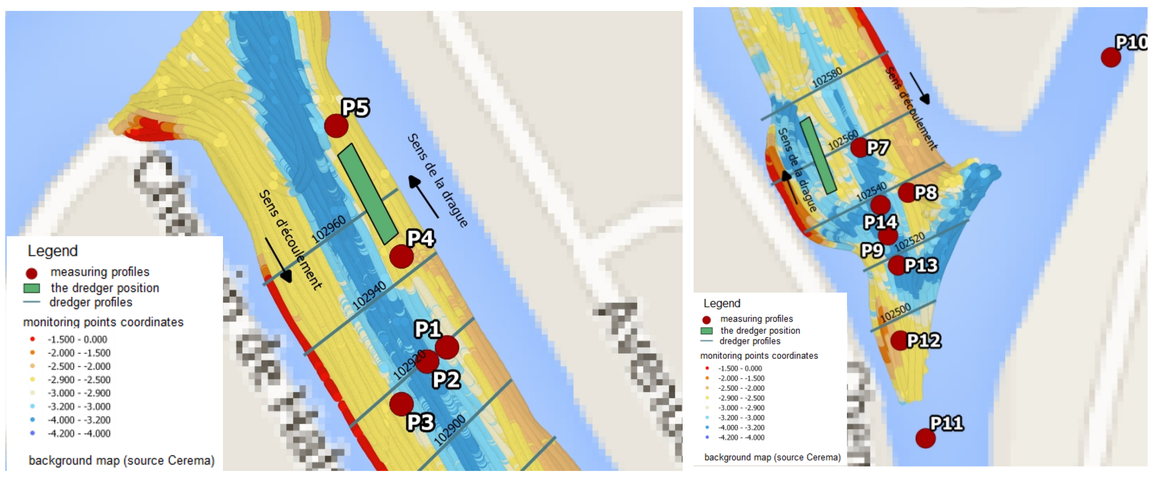
- Dissolved oxygen : the regulation limit is always observed (> 4mg/l)
- Good correlation between suspended solids, sediment grading and yield of the dredging operation

Parameters (average values)	Migennes 2016/07		Moisson 2016/09		Isle-Adam 2016/09			Canal Courcy 2017/06		
	upstream follow-up	downst. follow-up	upstream follow-up	downst. follow-up	upstream follow-up	middle follow-up	downst. follow-up	upstream follow-up	middle follow-up	downst. follow-up
Suspended solids SS (mg/l)	6	9	6,4	10	16,2	360	45	19	212	152
Dissolved oxygen (mg/l)	8	8,4	7,8	8,5	8,9	8,9	9,2	10,3	8,9	9,2
Temperature (°C)	21,2	20	20,1	20,2	17,2	17,2	16,9	25,4	25,7	25,6
pH max (acidification)	8,3	8,5	7,8	7,8	8,1	8	8,1	8,1	7,7	7,9
Yield (m3/jour)	609		408		240			480		
materials	coarse sand		coarse sand		Sandy silt			Silt		
Reg. threshold SS (O2>4mg/l)	<165 mg/l		<165 mg/l		<70 mg/l			<330 mg/l		
Overtakings [SS]	no		1		42 reduced to 12			25 (7 in, 6 downstream, 12 PL)		
Chemical state of the river	Good		Good		Bad			Good		

• Conclusions

- The variation of the various parameters is limited in time and space
- Hydrobiological study is ongoing
- Future recommendations for the asset manager

Location of test points – Janville's dredging, 2015



Sylvie Nouvion – Dupray*, Rémi Soave*, Justine Song**, Amélie Charnoz*, Alexis Guilpart*
* Cerema, street of Égalité Prolongée, 93 352 Le Bourget, France. / ** VNF, 20 quai d'Austerlitz, 75 012 Paris, France