

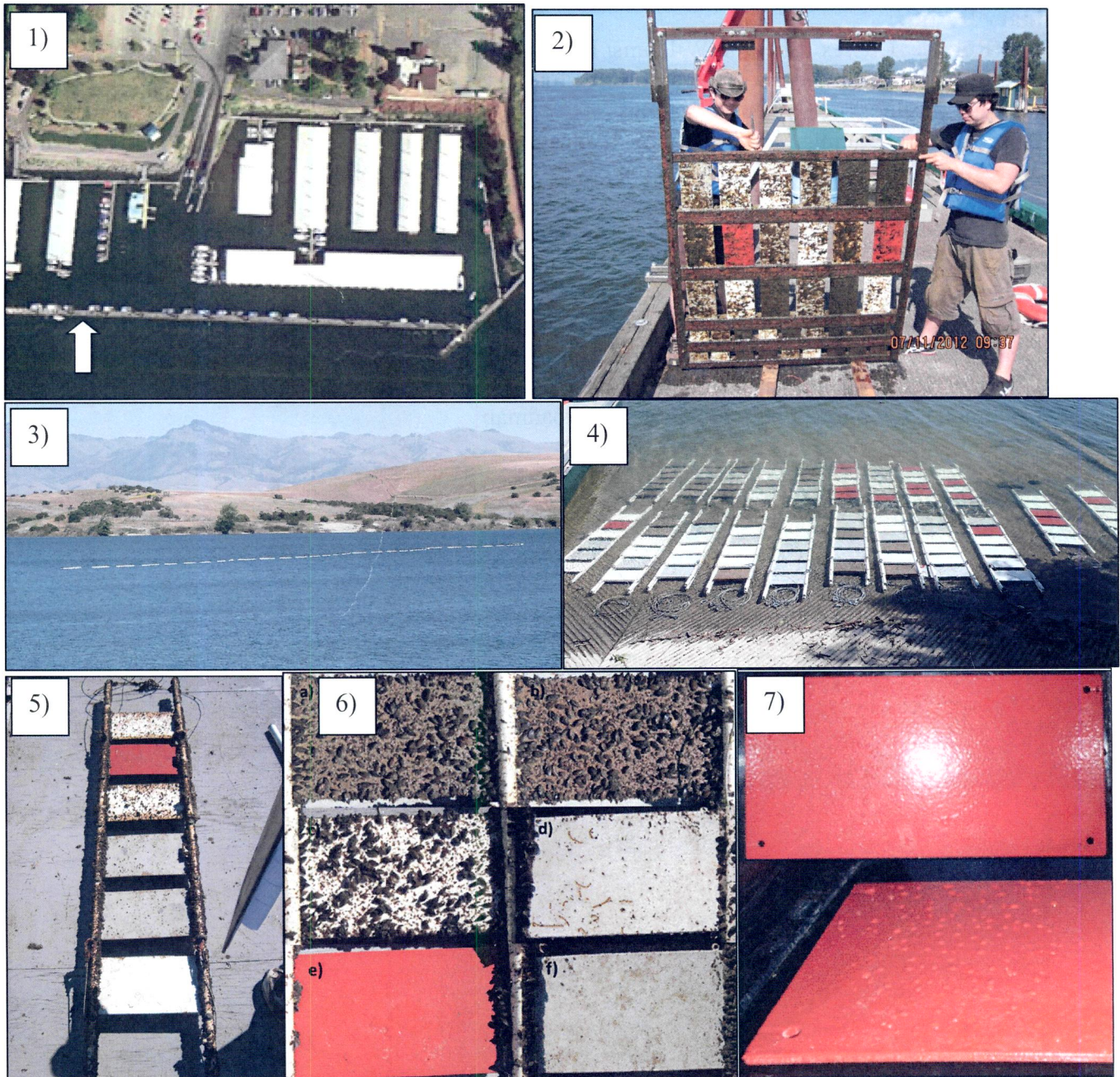
# Estimating costs of using foul-release type coatings to mitigate *Dreissena* sp. mussel macrofouling at a FCRPS facility

**Objective:** determine effective service life of foul-release type antifouling coatings under CR field conditions compared to protective coatings used by USACE for submerged steel and concrete.

**Coatings:** SherRelease/ Duplex (Sherwin Williams/ Fuji), Intersleek 970 (International), HempasilX3 (Hempel), Corps 766E vinyl, CrystalSEAL and bare concrete

**Methods:** Panel experiment in main stem Columbia. Durability and adhesion tests.

**Preliminary Results:** 1) FR effective algae & bivalves; 2) Some attachment to FR but easily cleaned; 3) Controls heavily fouled and difficult to clean; 4) FR soft but damage limited to minimal blistering.



Figures: 1) Columbia River deployment location; 2) steel frames used to deploy panels in Columbia River; 3) buoy structure used to deploy panels in San Justo Res, CA; 4) pvc frames used to deploy panels in San Justo; 5) top of panels after 5 mo. in San Justo; 6) bottom of panels after 5 mo. in San Justo showing a) bare concrete, b) CrystalSeal, c) Corps V766E vinyl, d) SherRelease FR, e) HempasilX3 FR, f) Intersleek970 FR; 7) physical damage, i.e., blisters, on FR.



# Estimating costs of using foul-release type coatings to mitigate *Dreissena* sp. mussel macrofouling at a FCRPS facility

**Goal:** develop accurate cost/benefit analyses for zebra/quagga mussel control options at FCRPS facilities

**Objectives:**

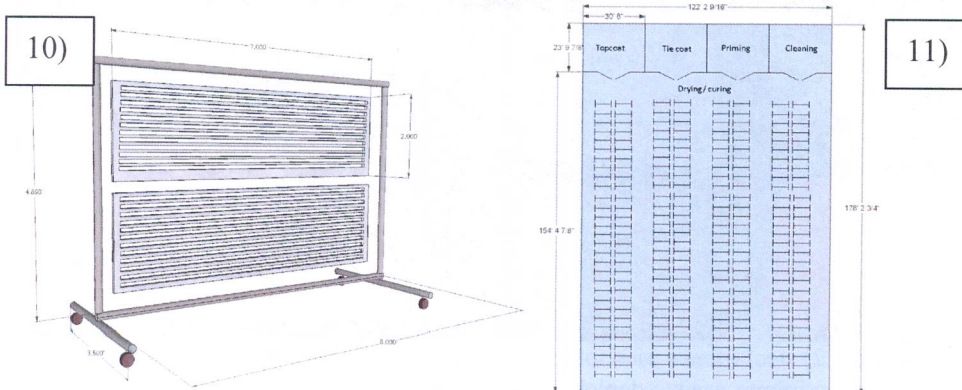
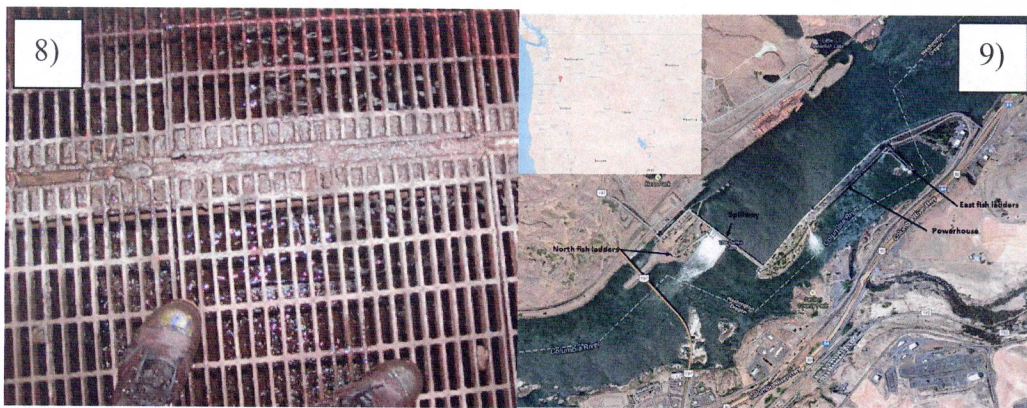
- 1) Identify candidate foul-release coating
- 2) Identify candidate FCRPS facility
- 3) Identify candidate facility component(s) to coat
- 4) Develop work plan
- 5) Develop budget

**Preliminary Results:**

- 1) SherRelease/ Duplex (Sherwin Williams/ Fuji Smart Surfaces LLC)
- 2) The Dalles Dam Project, US Army Corps of Engineers
- 3) Auxiliary water supply diffuser gratings
- 4) Approx. 1,000 gratings East TD removed, cleaned, dried, painted, cured, installed b/w Dec & mid-Jan; Approx. 300 gratings North TD removed, cleaned, dried, painted, cured and reinstalled b/w mid-Jan and Feb.
- 5) \$111,855 (labor, equipment & other DC; excludes permitting costs)

**Next Steps:**

- 1) Address permitting
- 2) External review, e.g., USACE RE labor estimates and permitting
- 3) Determine if coatings affect salmonid swimming behavior
- 4) Develop cost estimates for other control options, e.g., manually cleaning gratings.
- 5) Continue developing a regional AIS control roadmap



## Estimating costs of using foul-release type coatings to mitigate *Dreissena* sp. mussel macrofouling at a FCRPS facility

12)		Pre-Dec.	December, 2013												January, 2014											
Agency	Task		2	3	4	5	9	10	11	12	16	17	18	19	23	24	25	26	30	31	1	2	6	7	8	9
			M	T	W	R	M	T	W	R	M	T	W	R	M	T	W	R	M	T	W	R	M	T	W	R
USACE	Pre- & planning meeting																									
Gen laborers	Paint rack assembly																									
USACE, Constrct	Meeting @ The Dalles																									
USACE	Safety and security																									
Constrct	Unbolt grates																									
USACE	Map/ tag grates																									
Constrct	Stack grates & flat bars																									
USACE	Rigging & crane																									
Constrct	Forklift/ tie down/ unload																									
Constrct	Hang grates																									
Paint	Meeting @ paint																									
Paint	Clean, dry and prime																									
Paint	Tie coat																									
Paint	Topcoat																									
Constrct	Stack grates																									
Constrct	Forklift/ tie down																									
USACE	Rigging & crane																									
USACE	Map/ tag tracking																									
Constrct	Position & bolt grates/ bars																									
USACE	Inspection																									
Constrct, Paint	Cleanup/ Breakdown																									

13)		Pre-Dec	December												January										
Task		2	3	4	5	9	10	11	12	16	17	18	19	23	24	25	26	30	31	1	2	6	7	8	9
		M	T	W	R	M	T	W	R	M	T	W	R	M	T	W	R	M	T	W	R	M	T	W	R
Pre-planning meetings	46																								
Planning	98																								
Project meeting	15																								
Meeting @ The Dalles		5	5	5	5	5	5	5	6	6	6	6	6					6		6	6	6	6	6	
Safety and security		10	10	10	10	10	10	10	10	10	10	10	10					10		10	10	10	10	10	
Map/ tag grates		10	10	10	10	10	10	10	10	10	10	10	10					10		10	10	10	10	10	
Rigging		8	6	15	6	4	1		4			11						7		8	10				
Crane direction		3	3	10	13	21	8	4	3			9						5		6	7				
Crane		1	1	5	6	10	4	2	3			9						5		6	7				
Inspection									10	10	10	10	10					10		10	10	10	10	10	
<b>Personnel (hrs./ day)</b>																									
Chief	2																								
ESPM	6																								
PM	11																								
GS12	95	11	11	11	12	12	12	12	22	22	22	23	22					22		23	22	22	22	22	
ENG11	30	11	11	11	11	11	11	11	11	11	11	11	11					11		11	11	11	11	11	
SC	15	15	13	33	27	37	15	8	13	3	3	31	3					20		22	27	3	3	3	
<b>Daily Total (hours)</b>	<b>159</b>	<b>37</b>	<b>35</b>	<b>55</b>	<b>50</b>	<b>60</b>	<b>38</b>	<b>31</b>	<b>46</b>	<b>36</b>	<b>36</b>	<b>64</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>53</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>60</b>	<b>36</b>	<b>36</b>	

Figures & Tables: 8) AWS diffuser gratings; 9) location of gratings at The Dalles Dam Project; 10) paint rack; 11) warehouse floor plan; 12) work schedule for removal, cleaning, painting and reinstallation of ~1,000 gratings at East location within in-water work period; 13) USACE labor estimates for gratings at East location; 14) detailed budget to remove, clean, paint and reinstall ~1,300 AWS diffuser gratings (~ 111,832-ft<sup>2</sup> surface area) during in-water work period at The Dalles Dam including labor, equipment and other indirect costs, but excluding permitting costs.





**Estimating costs of using foul-release type coatings to mitigate *Dreissena* sp. mussel macrofouling at a FCRPS facility**

14)	Rate	\$\$\$
<b>Labor</b>		
USACE		
Chief, Planning, Environmental Resources and Fish Policy and Support Division	\$145.88/ hr. @ 3 hrs.	438
Environmental Stewardship and Compliance Program Manager	\$97.05/ hr. @ 8 hrs.	776
Project Manager, The Dalles Dam Project	\$97.05/ hr. @ 14 hrs.	1,359
Fish Biologist GS12, Project Lead	\$75.64/ hr. @ 642 hrs.	48,561
Engineer GS11, Safety and Security Officer	\$73.59/ hr. @ 380 hrs.	27,964
Structural Crew, Crane Operator	\$84.47/ hr. @ 402 hrs. + \$113.66/ hr. OT @ 24 hrs.	36,685
Construction Contractor		
Supervisor	\$110/ hr. @ 301 hrs. + \$151.50/ hr. OT @ 29 hrs.	37,504
Journeyman	\$105/ hr. @ 2,768 hrs. + \$144.62/ hr. OT @ 80 hrs.	302,210
Industrial Painting Contractor		
Supervisor	\$60/ hr. @ 245 hrs. + \$85/ hr. OT @ 21 hrs.	16,485
Journeyman	\$53/ hr. @ 1,554 hrs. + \$73/ hr. OT @ 198 hrs.	96,816
FUJIFILM Smart Surfaces LLC		
VP Marketing and Technical Support	\$95/ hr. @ 36 hrs.	3,420
<b>Equipment/ Supplies</b>		
Painting consumables	\$4/ hr. painting @ 1,012.5 hrs.	4,050
Blasting sundries	\$6/ hr. cleaning @ 364.5 hrs.	2,187
Painting safety sundries	\$4/ hr. cleaning/painting @ 1,419 hrs.	5,676
Paint racks (metal, wheels, hardware and assembly)	Materials @ \$38,261 + labor @ \$25/ hr. @ 640 hrs.	54,261
SherRelease/ Duplex coating materials	\$3,515.25/ 5-gal. kit @ 112 kits	393,708
Cleaners	\$14.39/ gal @ 56 gallons	806
Thinner	\$23.02/ gal @ 56 gallons	1,289
4-ply 14' nylon rigging sleeves	\$186.34/ ea. @ 8	1,491
super duty ratchet tie down	\$26.99/ ea. @ 30	810
polyethylene foam 1/8" thick x 50'	\$99.99/ ea. @ 20	2,000
<b>Other</b>		
Freight shipping	\$760 per truckload @ 12 truckloads	9,120
Forklift rental 5K electric forklift w/ charger	\$1,575/ mo/ ea. @ 2 units @ 3 mo. + \$85/ hr. pickup/delivery @ 11 hrs.	10,385
Warehouse leasing	\$0.44/ SF/mo. + \$0.08/ SF/mo. triple net + \$0.10/ SF/mo. utilities @ 21,716 SF for 4 months	53,856
<b>Total Direct Costs</b>		<b>\$1,111,855</b>

**Request copy of draft cost document/ comments: Steve Wells, [sww@pdx.edu](mailto:sww@pdx.edu), 503-725-8946**

