

Jun 22nd, 9:00 AM - 9:15 AM

## Stream Crossings I: Culvert Baffle Evaluation

Kelly Hughes

Follow this and additional works at: [https://scholarworks.umass.edu/fishpassage\\_conference](https://scholarworks.umass.edu/fishpassage_conference)

---

Hughes, Kelly, "Stream Crossings I: Culvert Baffle Evaluation" (2016). *International Conference on Engineering and Ecohydrology for Fish Passage*. 28.

[https://scholarworks.umass.edu/fishpassage\\_conference/2016/June22/28](https://scholarworks.umass.edu/fishpassage_conference/2016/June22/28)

This Event is brought to you for free and open access by the Fish Passage Community at UMass Amherst at ScholarWorks@UMass Amherst. It has been accepted for inclusion in International Conference on Engineering and Ecohydrology for Fish Passage by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact [scholarworks@library.umass.edu](mailto:scholarworks@library.umass.edu).



# Ecological Criteria

ology

All fish species – base flow

All fish species – low flow

All fish species – high flow

All fish sizes – low flow

All fish sizes – base flow

All fish sizes – high flow

Creates in-pipe habitat

Retains substrate

Not a further barrier to fish

# Hydrological Criteria

Hydrology

Reduces water velocity

Increases overall depth

Provides resting pools

Disrupts lamina flow

# Engineering Criteria

Engineering

Minimal impact on pipe capacity

Debris jam resistant

Durability in floods

# Installation Criteria

Installation

All types of culverts (shapes & materials)

Multiple culvert sizes

Retro-fit live culverts

Retro-fit dry culverts

Versatile/adaptable

# Other Criteria

Other

Overall life expectancy

Recycled/recyclable

Cost per meter

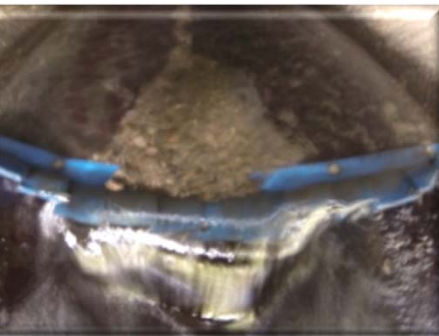
Implementation/uptake



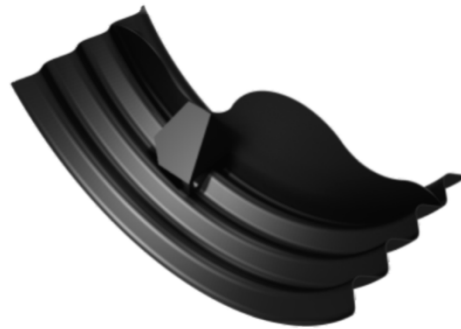
Cuboid Sheet (plastic)



Weir Type (fibre-glass)



Flexible Iris (polymer)



Factory Welded (plastic)



Bolted Plates (steel)



USFHD (steel)



Nova Scotia (concrete)



Elements		Cuboid Sheet Plastic	Weir Type Fibreglass	Flexible Iris Polymer	Factory Welded Plastic	Bolted Plates Steel	USFHD Steel	Nova Scotia Concrete
gy	All fish species – low flow	3	3	3	3	3	3	3
	All fish species – base flow	4	3	4	3	3	3	4
	All fish species – high flow	4	3	3	2	3	2	3
	All fish sizes – low flow	2	3	3	2	2	2	3
	All fish sizes – base flow	3	4	4	3	4	3	4
	All fish sizes – high flow	4	2	4	2	3	2	4
	Creates in-pipe habitat	1	4	4	2	2	3	3
	Retains substrate	2	4	3	2	2	3	3
	Not a further barrier to fish	4	2	3	3	5	3	3
	<b>Sub total</b>	27	28	31	22	27	24	31

5 - Excellent
4 - Good
3 - Fair
2 - Poor
1 - Undesirable

Key Elements		Cuboid Sheet Plastic	Weir Type Fibreglass	Flexible Iris Polymer	Factory Welded Plastic	Bolted Plates Steel	USFHD Steel	Nova Scotia Concrete
Hydrology	Reduces velocity	3	3	3	2	2	3	3
	Increases overall depth	2	4	4	3	2	3	4
	Provides resting pools	1	4	4	3	2	3	4
	Disrupts lamina flow	5	4	4	3	3	4	4
	<b>Sub total</b>	11	15	15	11	9	13	15

5 - Excellent
4 - Good
3 - Fair
2 - Poor
1 - Undesirable

Key Elements		Cuboid Sheet Plastic	Weir Type Fibreglass	Flexible Iris Polymer	Factory Welded Plastic	Bolted Plates Steel	USFHD Steel	Nova Scotia Concrete
Engineering	Minimal impact on capacity	2	3	4	3	2	2	2
	Debris resistant	2	3	5	3	2	3	3
	Durability in floods	3	2	5	4	3	3	3
	<b>Sub total</b>	7	7	14	10	7	8	8

5 - Excellent
4 - Good
3 - Fair
2 - Poor
1 - Undesirable

y Elements		Cuboid Sheet Plastic	Weir Type Fibreglass	Flexible Iris Polymer	Factory Welded Plastic	Bolted Plates Steel	USFHD Steel	Nova Scotia Concrete
Installation	All types of culverts	1	2	4	1	2	3	2
	Multiple culvert sizes	2	4	5	3	3	3	3
	Retro-fit wet culverts	1	2	4	0	2	3	2
	Retro-fit dry culverts	3	4	5	0	5	5	4
	Versatile/adaptable	1	1	5	0	3	2	1
<b>Sub total</b>		9	14	<b>23</b>	4	15	16	12

5 - Excellent
4 - Good
3 - Fair
2 - Poor
1 - Undesirable

lements		Cuboid Sheet Plastic	Weir Type Fibreglass	Flexible Iris Polymer	Factory Welded Plastic	Bolted Plates Steel	USFHD Steel	Nova Scotia Concrete
	Overall life expectancy	2	1	5	4	3	3	3
	Recycled/recyclable	5	1	5	3	2	2	2
	Cost/lineal meter culvert	1	2	5	3	3	3	2
	Implementation/uptake	1	2	3	1	1	3	2
		9	6	<b>18</b>	11	9	11	9

5 - Excellent
4 - Good
3 - Fair
2 - Poor
1 - Undesirable

Key Elements		Baffle Type						
		Cuboid Sheet Plastic	Weir Type Fibreglass	Flexible Iris Polymer	Factory Welded Plastic	Bolted Plates Steel	USFHD Steel	Nova Scotia Concrete
Ecology	All fish species – low flow	3	3	3	3	3	3	3
	All fish species – base flow	4	3	4	3	3	3	4
	All fish species – high flow	4	3	3	2	3	2	3
	All fish sizes – low flow	2	3	3	2	2	2	3
	All fish sizes – base flow	3	4	4	3	4	3	4
	All fish sizes – high flow	4	2	4	2	3	2	4
	Creates in-pipe habitat	1	4	4	2	2	3	3
	Retains substrate	2	4	3	2	2	3	3
	Not a further barrier to fish	4	2	3	3	5	3	3
	<b>Sub total</b>	27	28	31	22	27	24	31
Hydrology	Reduces velocity	3	3	3	2	2	3	3
	Increases overall depth	2	4	4	3	2	3	4
	Provides resting pools	1	4	4	3	2	3	4
	Disrupts lamina flow	5	4	4	3	3	4	4
	<b>Sub total</b>	11	15	15	11	9	13	15
Engineering	Minimal impact on capacity	2	3	4	3	2	2	2
	Debris jam resistant	2	3	5	3	2	3	3
	Durability in floods	3	2	5	4	3	3	3
	<b>Sub total</b>	7	7	14	10	7	8	8
Installation	All types of culverts	1	2	4	1	2	3	2
	Multiple culvert sizes	2	4	5	3	3	3	3
	Retro-fit live culverts	1	2	4	0	2	3	2
	Retro-fit dry culverts	3	4	5	0	5	5	4
	Versatile/adaptable	1	1	5	0	3	2	1
<b>Sub total</b>	9	14	23	4	15	16	12	
Other	Overall life expectancy	2	1	5	4	3	3	3
	Recycled/recyclable	5	1	5	3	2	2	2
	Cost per meter	1	2	5	3	3	3	2
	Implementation/uptake	1	2	3	1	1	3	2
	9	6	18	11	9	11	9	
<b>Evaluation Score - (max 120)</b>		<b>63</b>	<b>70</b>	<b>101</b>	<b>58</b>	<b>67</b>	<b>72</b>	<b>75</b>

5 - Excellent
4 - Good
3 - Fair
2 - Poor
1 - Undesirable

# END



Presenter: Kelly Hughes  
ATS Environmental

[ats-environmental.com](http://ats-environmental.com)