Scenario 2:

Guidewalls at Lock & Dams 20-25

Scenario 3:

Guidewalls at Lock and Dams 14-18 Lock Extensions at Lock and Dams 20-25

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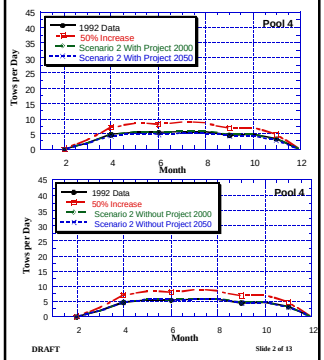
Pool 4 Scenario 2



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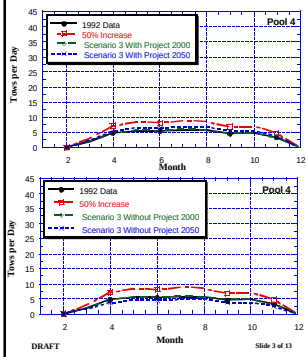
Pool 4 Scenario 3



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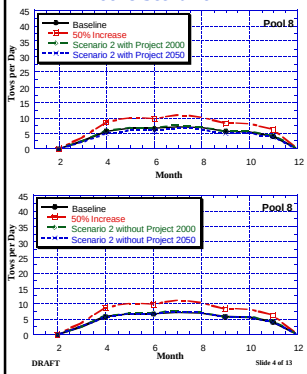
Pool 8 Scenario 2



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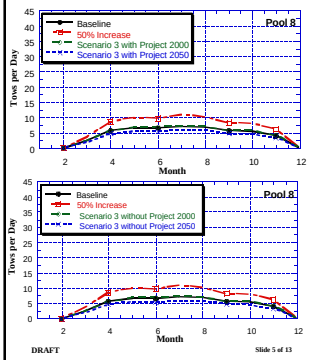
Pool 8 Scenario 3



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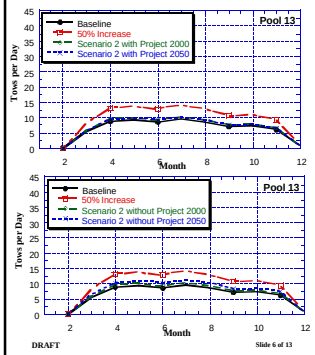
Pool 13 Scenario 2



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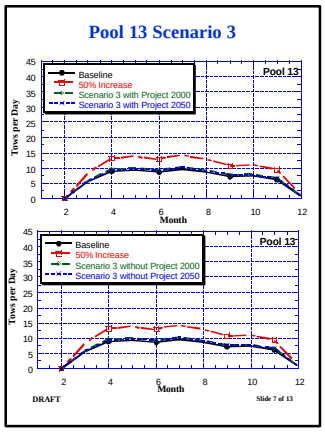
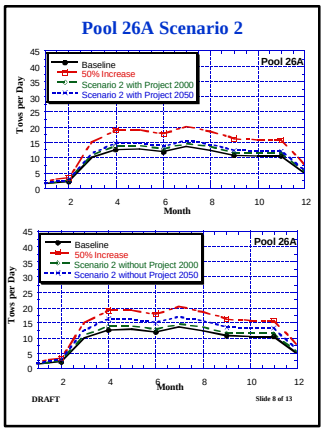
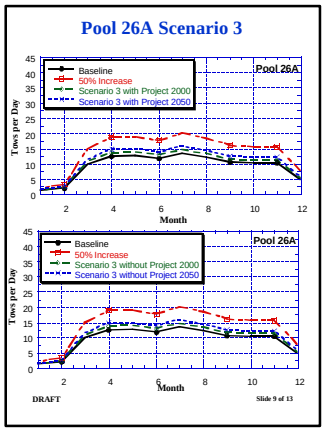

Pool 13 Scenario 3
Pool 13
Baseline
50% Increase
Scenario 3 with Project 2000
Scenario 3 with Project 2050
Pool 13
Baseline
50% Increase
Scenario 3 without Project 2000
Scenario 3 without Project 2050
Tows per Day
Month
DRAFT
Slide 7 of 13


Pool 26A Scenario 2
Pool 26A
Baseline
50% Increase
Scenario 2 with Project 2000
Scenario 2 with Project 2050
Pool 26A
Baseline
50% Increase
Scenario 2 without Project 2000
Scenario 2 without Project 2050
Tows per Day
Month
DRAFT
Slide 8 of 13


Pool 26A Scenario 3
Pool 26A
Baseline
50% Increase
Scenario 3 with Project 2000
Scenario 3 with Project 2050
Pool 26A
Baseline
50% Increase
Scenario 3 without Project 2000
Scenario 3 without Project 2050
Tows per Day
Month
DRAFT
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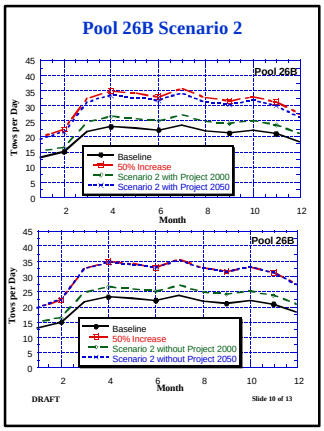
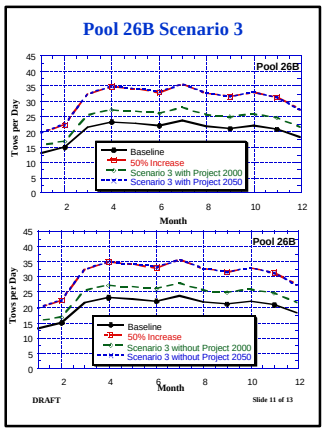

Pool 26B Scenario 2
Pool 26B
Baseline
50% Increase
Scenario 2 with Project 2000
Scenario 2 with Project 2050
Pool 26B
Baseline
50% Increase
Scenario 2 without Project 2000
Scenario 2 without Project 2050
Tows per Day
Month
DRAFT
Slide 10 of 13


Pool 26B Scenario 3
Pool 26B
Baseline
50% Increase
Scenario 3 with Project 2000
Scenario 3 with Project 2050
Pool 26B
Baseline
50% Increase
Scenario 3 without Project 2000
Scenario 3 without Project 2050
Tows per Day
Month
DRAFT
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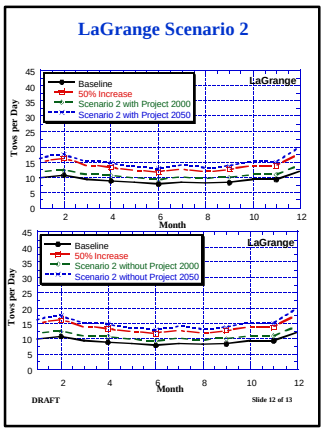
LaGrange Scenario 2
LaGrange
Baseline
50% Increase
Scenario 2 with Project 2000
Scenario 2 with Project 2050
LaGrange
Baseline
50% Increase
Scenario 2 without Project 2000
Scenario 2 without Project 2050
Tows per Day
Month
DRAFT
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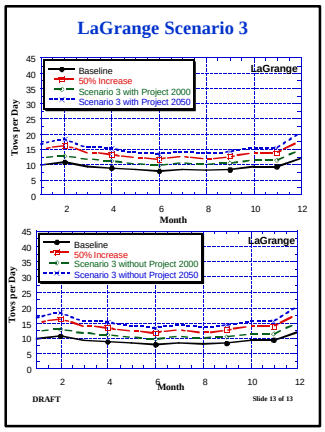
Attachment 6



Average Incremental Impacts of Traffic Scenario on Emerald Shiner in Pool 13 in June, 2020.						
	Δ Larvae Killed (# larvae)	Δ Percent of Total Larval Production	Δ CEM (fraction)	ΔEAL (#fish)	Δ Recruitment Forgone (#fish)	Δ Production Forgone (tonnes)
Scenario 2						
without - 2000	14,400,000	0.072	0.0021	***	185,000	0.40
with - without	139,000,000	0.644	0.0169	***	1,670,000	3.59
Scenario 3						
without - 2000	0	0	0	0	0	0
with - without	390,000,000	1.930	0.0409	***	5,010,000	10.60

Average Incremental Impacts of Traffic Scenario on Freshwater Drum in Pool 13 in June, 2020.						
	Δ Larvae Killed (# larvae)	Δ Percent of Total Larval Production	Δ CEM (fraction)	ΔEAL (#fish)	Δ Recruitment Forgone (#fish)	Δ Production Forgone (tonnes)
Scenario 2						
without - 2000	2,900,000	0.070	0.0021	2,370	27	455
with - without	18,800,000	0.625	0.0166	21,200	239	4,090
Scenario 3						
without - 2000	0	0	0	0	0	0
with - without	56,500,000	1.880	0.0402	63,100	718	12,200

Average Incremental Impacts of Traffic Scenario on Channel Catfish in Pool 13 in July, 2020.						
	Δ Larvae Killed (# larvae)	Δ Percent of Total Larval Production	Δ CEM (fraction)	ΔEAL (#fish)	Δ Recruitment Forgone (#fish)	Δ Production Forgone (tonnes)
Scenario 2						
without - 2000	32,800	0.031	0.0026	7,780	11	3.6
with - without	296,000	0.285	0.0201	69,800	99	32.5
Scenario 3						
without - 2000	0	0	0	0	0	0
with - without	952,000	0.918	0.0527	223,000	322	105.0

Average Incremental Impacts of Traffic Scenario on Walleye in Pool 13 in April, 2020.						
	Δ Larvae Killed (# larvae)	Δ Percent of Total Larval Production	Δ CEM (fraction)	ΔEAL (#fish)	Δ Recruitment Forgone (#fish)	Δ Production Forgone (tonnes)
Scenario 2						
without - 2000	244,000	0.061	0.0028	27,100	3	121
with - without	1,950,000	0.487	0.0212	217,000	22	969
Scenario 3						
without - 2000	0	0	0	0	0	0
with - without	6,590,000	1.640	0.0597	727,000	75	3,270

Average Incremental Impacts of Traffic Scenario on Gizzard Shad in Pool 13 in June, 2020.						
	Δ Larvae Killed (# larvae)	Δ Percent of Total Larval Production	Δ CEM (fraction)	ΔEAL (#fish)	Δ Recruitment Forgone (#fish)	Δ Production Forgone (tonnes)
Scenario 2						
without - 2000	5,100,000	0.064	0.0024	871,000	51	115
with - without	45,900,000	0.577	0.0185	7,810,000	460	1,030
Scenario 3						
without - 2000	0	0	0	0	0	0
with - without	138,000,000	1.730	0.0460	23,200,000	1,380	3,100

Average Incremental Impacts of Traffic Scenario on Mooneye in Pool 13 in June, 2020.						
	Δ Larvae Killed (# larvae)	Δ Percent of Total Larval Production	Δ CEM (fraction)	ΔEAL (#fish)	Δ Recruitment Forgone (#fish)	Δ Production Forgone (tonnes)
Scenario 2						
without - 2000	10,100	0.009	0.0003	203	5	0.4
with - without	90,800	0.077	0.0020	1,820	42	3.2
Scenario 3						
without - 2000	0	0	0	0	0	0
with - without	272,000	0.230	0.0049	5,410	125	9.5

Comparison of 1995 Commercial Catch Data with Incremental Impacts on Recruitment Forgone for Freshwater Drum. (Units: number of fish)

(With Project - Without Project) for Scenario 2 and 3 for Year 2020.

Pool	1995 Commercial Catch	Scenario 2 Δ Recr. Forgone	Scenario 3 Δ Recr. Forgone
4	39	224	746
8	104,286	328	1,020
13	57,088	314	958
26	8,375	910	3,200

Comparison of 1995 Commercial Catch Data with Incremental Impacts on Recruitment Forgone for Channel Catfish. (Units: number of fish)

(With Project - Without Project) for Scenario 2 and 3 for Year 2020.

Pool	1995 Commercial Catch	Scenario 2 Δ Recr. Forgone	Scenario 3 Δ Recr. Forgone
4	5,345	168	543
8	33,238	126	391
13	239,931	224	706
26	10,550	1,636	5,740

Comparison of Power Plant Entrainment Data with Incremental Impacts on Larvae Entrained by Commercial Vessels. (Units: number of larvae)

(With Project - Without Project) for Scenario 2 and 3 for Year 2020.

Location	Power plant entrainment	Scenario 2 Δ Larvae killed	Scenario 3 Δ Larvae killed
Channel catfish			
Pool 4	455,350*	496,000	1,610,000
Freshwater Drum			
Pool 5 (John Madgett)	8,205,239	5,940,000	1,970,000
Pool 9 (Genoa #3)	3,088,783	33,800,000	107,000,000
Gizzard Shad			
Pool 5 (John Madgett)	4,632,537	21,000,000	65,300,000
Pool 9 (Genoa #3)	956,149	22,500,000	3,830,000

Comparison of Incremental Impacts on 2020 Recruitment Forgone for Six Selected Fish Species in the UMR-IWW Based on Two Commercial Traffic Scenarios.

	UMR	IWW	Total System
Emerald Shiner			
Scenario 2			
without -y 2000	15,900,000	17,100,000	33,000,000
with - without	28,700,000	11,300	28,711,300
Scenario 3			
without - y 2000	20,200,000	21,400,000	41,600,000
with - without	98,300,000	661,000	98,961,000
Freshwater Drum			
Scenario 2			
without -y 2000	21,000	14,200	35,200
with - without	73,300	118	73,418
Scenario 3			
without - y 2000	25,600	17,900	43,500
with - without	246,000	442	246,442
Mooneye			
Scenario 2			
without -y 2000	7,860	2,170	10,030
with - without	21,300	0	21,300
Scenario 3			
without - y 2000	9,810	2,680	12,490
with - without	72,500	8	72,508
Gizzard Shad			
Scenario 2			
without -y 2000	8,190	34,600	42,790
with - without	15,800	31	15,831
Scenario 3			
without - y 2000	10,200	43,300	53,500
with - without	53,700	1,580	55,280

Comparison of Incremental Impacts on 2020 Recruitment Forgone for Six Selected Fish Species in the UMR-IWW Based on Two Commercial Traffic Scenario's - continued.

	UMR	IWW	Total System
Channel Catfish			
Scenario 2			
without -y 2000	9,590	2,890	12,480
with - without	17,900	15	17,915
Scenario 3			
without - y 2000	12,000	3,620	15,620
with - without	61,200	115	61,315
Walleye			
Scenario 2			
without -y 2000	72	16	88
with - without	514	0	514
Scenario 3			
without - y 2000	513	20	533
with - without	1,740	1	1,741

Location	Power plant entrainment	Scenario 2 Δ Larvae killed	Scenario 3 Δ Larvae killed
Emerald Shiner			
Pool 5 (John Madgett)	**2,000,026**	**579,600**	**1,820,000**
Pool 9 (Genoa #3)	**857,850**	**1,700,000**	**5,320,000**

*** Riverside Generating Plant, Upper St. Anthony Falls**

Attachment 6

Fish Modelling and Traffic Projections

25th Meeting of the NECC
May 4-5,1999

Presented by

Steve Bartell
The Cadmus Group, Inc.