

Pallid Sturgeon Recovery Needs for RPA 4 and RPA 5  
as identified in a survey of the Middle Basin Pallid Sturgeon Recovery Work Group

Thirty-one people completed the recovery needs survey. The survey consisted of two parts. In the first portion of the survey respondents were asked to assign one number (1-2-3-4-5) to each of the five ranking criteria. Each number could only be used once. A respondent would label the criteria s/he felt was most important with a five and items s/he felt were less important would receive lower numbers. The least important criteria received a one.

The ranking criteria were defined as:

- I - Does it fill an information gap for pallid sturgeon biology?
- Q - Do we need the results quickly?
- D - Is the project do-able?
- R - Are other monitoring or research needs based on the results?
- M - Does it relate to mitigation or enhancement?

The second portion of the survey listed the potential recovery needs compiled from suggestions of work group members. The recovery needs were lumped into six general themes:

- Coordination and Outreach
- Habitat Restoration
- Habitat Use and Requirements
- Life History and Population Assessment
- Minimize Adverse Effects
- Propagation and Augmentation

The respondents then ranked each recovery need five times; once for each of the ranking criteria. They assigned one number (1-2-3-4-5) with five being most important and one the least important. There was no limit to the number of times a rank could be assigned. For example, with the recovery need "Develop and distribute annual progress report and work plan priorities" the respondent would decide if this filled an information gap (1-5). Should it be done quickly (1-5)? Is it do-able (1-5)? Are other project needs based on results of this need (1-5)? Does this relate to mitigation or enhancement (1-5)? The respondents may have ranked every criteria with a five, with a one, or with any combination of numbers based on their experience, information needs, and opinions.

There were recommendations made at the November 2001 work group meeting that median scores should be evaluated as the scoring options were discrete values (1-2-3-4-5) and not continuous numbers (i.e. 1.5 was not an option). However, average scores were used in the recovery needs survey results of the Upper Basin Work Group and a desire was expressed to compare and contrast work group survey results.

The average score for each ranking criteria was computed. The most important ranking criteria was Information Gap with an average score of 4.5. The least important ranking criteria was the speediness of the results with a average score of 2.0.

The average ranking criteria were multiplied by the average score for each ranking criteria associated with each recovery need. These weighted scores were added to acquire a total score for each recovery need. The weighted scores of each recovery need were ranked for each category and for the entire list of recovery needs.

Overall, the highest ranked recovery needs in the total survey dealt primarily with the survival of hatchery stocked fish and the identification of habitat use in different life stages. The lowest ranked items fell primarily in the Coordination and Outreach category. The one exception to this is the rank of 12 for “Develop and distribute annual progress report and work plan priorities”. Kudos to Steve Krentz for his Recovery Plan Update publication.

Table 1. Highest and lowest ranked recovery needs for each category.

<b>Category</b>	<b>Highest Ranked Need</b>	<b>Lowest Ranked Need</b>
Coordination and Outreach	Develop & distribute annual progress report and work plan priorities	Distribute pallid sturgeon to aquariums and zoos
Habitat Restoration	Evaluate habitat restoration projects and efforts	Evaluate, investigate and find solutions for fish passage technology for passing sturgeon over low head dams (immediate emphasis on Bowersock Dam and Johnson County Weir on Kansas River)  Evaluate, investigate and find solutions to prevent entrainment of pallid sturgeon in diversion structures
Habitat Use and Requirements	Locate, define and characterize and quantify juvenile and rearing habitat	Investigate the influence of modified habitats of headwaters on survival of larval and juvenile sturgeon
Life History and Population Assessment	Locate, quantify and characterize pallid spawning area, frequency and behavior	Conduct food habits study of piscivorous fish downstream of spawning areas to help determine spawning success
Minimize Adverse Effects	Commercial fishing impacts	Sport fishing
Propagation and Augmentation	Determine survival rates and movements of stocked fish	Develop cryopreservation techniques

# Ranking Criteria

	Average Score
I - Does it fill an information gap for pallid sturgeon biology?	4.5
Q - Do we need the results quickly?	2.0
D - Is the project do-able?	3.3
R - Are other important monitoring or research needs based on the results?	2.7
M - Does it relate to mitigation or enhancement?	2.5

# Coordination and Outreach

	Average Criteria Scores						Weighted Scores			Total Question	Category Ranking	Total Ranking		
	I	Q	D	R	M		I	Q	D				R	M
Develop and distribute annual progress report and work plan priorities	3.8	3.5	4.8	3.8	3.2		17.2	7.2	15.8	10.3	7.9	58.4	1	12
Conduct aggressive public outreach campaign to generate support for pallid sturgeon recovery	2.6	3.8	4.2	2.6	2.7		11.5	7.8	14.1	7.0	6.8	47.1	3	30
Develop materials - brochures, posters, coloring books, boat ramp signs, stickers, magnets, press releases, video products, pallid sturgeon website	2.9	3.4	4.2	2.2	2.5		13.0	7.0	14.1	5.8	6.2	46.0	4	33 *
Investigate any and all funding sources for recovery and outreach	2.9	4.1	4.2	3.8	3.3		12.8	8.3	14.1	10.3	8.2	53.6	2	23
Establish pallid sturgeon foundation	2.2	2.6	3.3	2.9	2.4		9.9	5.3	10.9	7.7	5.9	39.6	5	39
Distribute pallid sturgeon to aquariums and zoos	2.4	2.2	3.8	1.8	1.7		10.6	4.6	12.6	4.8	4.2	36.7	8	42
Market outreach items	2.4	2.6	3.6	1.9	1.7		10.6	5.4	12.1	5.2	4.3	37.5	7	41
Tie into Lewis and Clark Bicentennial Celebration	2.3	3.0	3.5	1.8	1.9		10.5	6.0	11.7	4.8	4.7	37.8	6	40

\* tied ranking

# Habitat Restoration

	Average Criteria Scores						Weighted Scores				Total Question	Category Ranking	Total Ranking		
	I	Q	D	R	M		I	Q	D	R				M	
Evaluate, investigate and find solutions for fish passage technology for passing sturgeon over low head dams (immediate emphasis on Bowersock Dam and Johnson County Weir on Kansas River)	3.0	2.6	3.4	2.8	3.4		13.6	5.4	11.3	7.4	8.4	46.0	7	*	33
Evaluate, investigate and find solutions to prevent entrainment of pallid sturgeon in diversion structures	3.3	2.6	3.3	2.6	3.3		14.8	5.2	10.9	7.0	8.1	46.0	7	*	33
Operate hydro system to mimic natural hydrograph during spawning season	3.8	3.7	3.6	3.9	4.2		17.2	7.6	12.1	10.4	10.5	57.8	3		15
Evaluate habitat restoration projects and efforts	4.1	4.1	4.3	4.4	4.5		18.6	8.4	14.3	11.8	11.2	64.2	1		4
Increase habitat diversity	3.4	3.8	4.0	3.9	4.4		15.1	7.6	13.2	10.5	10.8	57.2	4		18
Increase woody debris	2.7	2.9	3.9	3.0	3.7		12.1	6.0	13.1	8.1	9.1	48.3	6		26
Support mitigation and land acquisition projects	2.9	3.8	4.4	3.8	4.6		13.0	7.6	14.8	10.2	11.3	56.8	5		20
Characterize historical and current habitat (integrate with Recovery Plan)	4.1	3.4	3.9	4.0	3.9		18.5	6.8	13.1	10.8	9.6	58.8	2		10

\* tied ranking

# Habitat Use and Requirements

	Average Criteria Scores						Weighted Scores						Total Question	Category Ranking	Total Ranking
	I	Q	D	R	M		I	Q	D	R	M				
Determine habitat use by larval pallid sturgeon	4.6	4.0	3.8	4.4	4.4		20.8	8.2	12.7	11.7	10.9	64.4	2	3	
Determine habitat use of stocked fish	4.1	3.6	4.3	4.0	3.9		18.5	7.4	14.2	10.7	9.8	60.6	5	7	
Determine optimal seasonal flows, temperature and turbidity for pallid sturgeon	4.5	3.7	3.3	4.4	4.4		20.2	7.5	10.9	11.9	10.8	61.2	4	6	
Locate, define and characterize adult pallid sturgeon habitat	4.4	3.9	4.0	4.4	4.2		19.7	7.9	13.4	11.8	10.5	63.3	3	5	
Locate, define and characterize and quantify juvenile and rearing habitat	4.8	4.2	3.7	4.6	4.4		21.4	8.5	12.3	12.3	11.0	65.4	1	2	
Investigate the influence of modified habitats of headwaters on survival of larval and juvenile sturgeon	3.2	2.9	3.0	3.1	2.8		14.3	5.9	10.0	8.2	7.0	45.4	7	34	
Evaluate and predict impacts of hydro development and operation on habitat and pallid sturgeon populations (includes altered flow regimes, water level manipulations, sedimentation)	4.2	3.4	3.4	3.9	4.2		18.9	6.9	11.3	10.5	10.3	58.0	6	13	

# Life History and Population Assessment

	Average Criteria Scores					Weighted Scores					Total Question Score	Category Ranking	Total Ranking
	I	Q	D	R	M	I	Q	D	R	M			
Determine dispersal behavior and drift distance of larval sturgeon life stages	4.5	3.4	3.5	4.0	3.4	20.4	6.9	11.5	10.6	8.4	57.8	5	15
Locate, quantify and characterize pallid spawning area, frequency and behavior	4.8	4.2	3.8	4.7	4.4	21.7	8.6	12.6	12.6	11.0	66.5	1	1
Determine age structure of wild pallid sturgeon population(s)	4.5	3.5	3.7	4.2	3.4	20.1	7.2	12.2	11.2	8.5	59.2	2	9 *
Conduct virus and other disease monitoring on wild pallids	3.7	3.3	3.1	3.1	2.3	16.5	6.7	10.4	8.4	5.7	47.7	9	29
Develop sampling techniques and gear for larval, juvenile and adults	4.1	3.6	4.0	4.4	3.1	18.5	7.3	13.3	11.7	7.7	58.5	3	11
Develop methods for species identification at all life stages	4.3	3.9	3.7	4.0	3.2	19.1	7.9	12.4	10.8	7.9	58.1	4	13
Conduct food habits study of piscivorous fish downstream of spawning areas to help determine spawning success	3.3	2.3	3.1	3.1	2.5	14.9	4.7	10.3	8.3	6.2	44.3	10	36 *
Develop pallid sturgeon population status	4.3	3.7	3.3	3.9	3.5	19.1	7.5	11.0	10.5	8.8	56.9	6	19
Evaluate the possibility and importance of imprinting	3.7	2.7	3.1	3.6	2.7	16.4	5.5	10.2	9.5	6.7	48.3	8	26 *
Develop/improve age and growth techniques	4.0	3.5	3.8	3.9	2.6	18.1	7.1	12.6	10.5	6.5	54.9	7	21

• tied ranking

# Minimize Adverse Effects

	Average Criteria Scores					Weighted Scores					Total Question Score	Category Ranking	Total Ranking
	I	Q	D	R	M	I	Q	D	R	M			
<b>Dredging - sand and gravel and channel maintenance</b>	3.3	3.1	3.8	3.1	3.7	14.9	6.3	12.5	8.2	9.3	51.3	2*	24*
<b>Commercial fishing impacts</b>	4.0	4.2	4.0	4.0	2.8	17.9	8.5	13.3	10.6	6.9	57.3	1	17
<b>Sport fishing</b>	3.2	2.9	3.7	3.1	2.2	14.5	5.8	12.1	8.3	5.4	46.3	4	32
<b>Contaminants</b>	3.7	3.2	3.8	3.4	2.6	16.6	6.4	12.8	9.1	6.5	51.3	2*	24*
<b>Intakes/Entrainment (power plant, municipal,</b>	3.1	2.6	3.7	3.0	2.9	14.1	5.3	12.3	8.0	7.2	46.8	3	31

\* tied ranking



# Propagation and Augmentation

	Average Criteria Scores										Total Question Score	Category Ranking	Total Ranking
	I	Q	D	R	M	I	Q	D	R	M			
	Weighted Scores												
Increase emphasis on brood fish collection and propagation	2.6	3.7	3.8	3.0	3.4	11.5	7.5	12.7	8.1	8.4	48.2	9	28
Improve fish holding capabilities at designated hatcheries	2.4	3.0	3.8	2.9	2.9	10.9	6.1	12.6	7.6	7.3	44.5	10	37
Maximize propagation efforts to ensure future progeny in hatcheries	2.9	3.4	4.1	3.1	3.4	13.0	6.9	13.7	8.4	8.4	50.3	7	26
Ensure survival of progeny in hatcheries	3.0	3.7	3.9	3.5	3.0	13.6	7.5	13.1	9.3	7.5	51.0	6	25
Monitor and evaluate stocking	4.2	3.4	4.0	4.2	3.6	18.9	7.0	13.2	11.2	9.0	59.2	2	9
Determine survival rates and movements of stocked fish	4.4	3.5	3.9	4.1	3.7	19.6	7.0	12.8	11.1	9.2	59.7	1	8
Continue virus and other disease monitoring and prevention methods	3.9	3.9	3.7	3.5	2.7	17.5	7.9	12.2	9.5	6.7	53.7	4	22
Identify potential contaminants bio-accumulation issues	3.8	2.8	3.8	3.3	2.6	16.9	5.6	12.5	8.7	6.5	50.2	8	27
Evaluate reproductive status of pallid sturgeon	4.4	3.6	3.4	4.1	3.3	19.9	7.3	11.2	11.0	8.2	57.6	3	16
Develop cryopreservation techniques	2.6	2.6	3.2	2.6	2.0	11.8	5.4	10.5	7.0	5.0	39.7	12	38
Improve spawning and culture techniques	2.7	2.9	3.7	2.9	2.5	12.1	5.9	12.2	7.8	6.1	44.1	11	35
Identify and evaluate long term tags	3.4	2.9	3.9	3.9	2.7	15.1	6.0	13.1	10.4	6.6	51.2	5	23